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THE CANADIAN GEOGRAPHICAL SOCIETY

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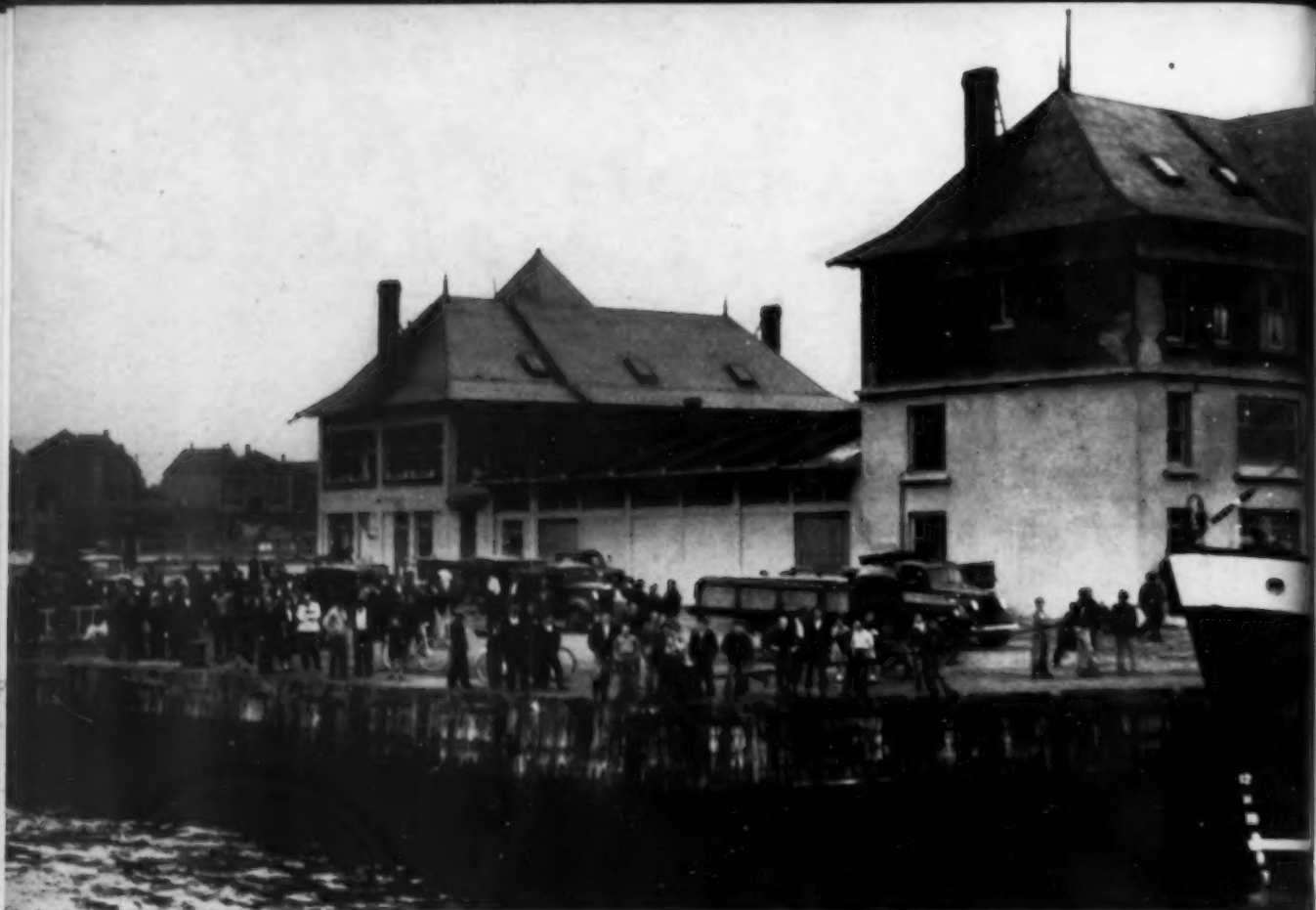
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On boat days the entire population of St. Pierre heads for the wharf, on which stands the combined post office and customs building. The post office occupies the part on the left; the customs—"La Douane"—the part on the right.

Many of the old wharves and walls have fallen into disrepair in St. Pierre and the town presents startling contrasts between such ruins and the trim, well-kept buildings that are in use. This view is towards "La Douane".





The Square Joffre is the second focal point of the town, after Le Quai. Government buildings overlook the flower beds of the square.

The Poker-Faced Islands of France

by ADELAIDE LEITCH

Photographs by the author

IF ever a town was poker-faced it is St. Pierre—isolated on its rocky island ten miles off the coast of Newfoundland but preserving the dignity of the Republic of France along with the legend of its past.

Sixty years ago, the old square-riggers from St. Malo, the fishing fleets of Gloucester, Newfoundland and Lunenburg, crowded into the harbour in such numbers that sometimes one could, quite literally, cross from shore to shore on the decks of the vessels in port. The Newfoundland Bait Acts in the late nineteenth and early twentieth centuries practically signed the death warrant for the prosperity of the little French colony by forbidding the French fishing fleets to obtain bait on the coast of Newfoundland. The highly developed, Parisian social life of the islands, as well as its prosperity, gradually declined.

Later came the glittering era of the twenties, when St. Pierre and Miquelon suddenly found themselves—for a time—the centre of one of the most lucrative rum-running trades in America.

Now, the gray, wooden buildings cluster around the yellowish government buildings of the Square Joffre, and the peculiar architecture of the customs and post office strikes a strange note on the Quai de la Roncière—renamed Quai Général DeGaulle after the war. Here and there you come, surprisingly, on a house that has been freshly painted a bright yellow or an eggshell blue, and the town hall is a trim, spotless white building trimmed elegantly with scarlet. Ladders are on all the roofs by law—because of the ever-present danger of fire that has levelled St. Pierre more than once. Today, at first glance, it all looks respectably dull.



Life in the fishermen's section of St. Pierre, across the harbour from the shops, is in direct contrast to the metropolitan life of the main part of the town.

The stores are like houses, and the houses frequently resemble stores. But their cautious, noncommittal exteriors again harbour French wines whose import was abruptly discontinued during the war but which are now so plentiful that even the St. Pierrais have not tasted them all. There are French kid gloves, light as black butterflies, French perfumes that are cheap by Canadian price scales but cannot be brought into the country, and American cigarettes at thirteen cents a pack, and cheaper than in the United States. You can purchase everything

from a No. 5 flashbulb to a "cyrano", wispy bit of French pastry, somewhere in St. Pierre, although it may take some time to find just where. When they go home to lunch some of the store-keepers remove and take with them their doorknobs. It is the simplest method of locking up, but a little disconcerting to visitors reaching for the handles that are not there.

The stores may open on Sunday, if a boat is in, close in mid-week, if there is a ball game with visiting Newfoundlanders, or sometimes just if it is a nice day for a stroll in the country. The customs men, high in their eyrie at "La Douane", are friendly although a little arbitrary in their dealings with the public. Usually, they require that all money be deposited with them on arrival and converted into French francs as required. Sometimes, however, a visitor comes ashore after the simple procedure of purchasing ten dollars' worth of French money or possibly keeping everything in Canadian funds. The store-keepers dislike the government's corner-



Newfoundland dogs are found everywhere in St. Pierre and Miquelon. Until a few years ago the breed had remained pure on these islands but it is now becoming mixed with other strains.

THE POKER-FACED ISLANDS OF FRANCE

ing of this foreign exchange, since it is difficult for them to acquire it for their own trips to the mainland. Everyone is delighted by the appearance of a visitor replete with foreign currency!

Their own tokens of barter are the pretty, featherweight aluminum coins—1 franc, 2 franc and 5 franc pieces—and French folding money in higher denominations. A dollar's worth is enough to fill an average purse and give the shopper the glorious sense of the spendthrift. The St. Pierre franc, incidentally, is worth two Paris francs.

St. Pierre and Miquelon, remnants of France's once-powerful American empire, could scarcely be more independent of each other. Although the whole archipelago—three large islands and many small ones—occupies less than ninety square miles and supports only about 4,330 people, the individual communities do not even resemble each other. St. Pierre, main settlement and only port, is a city of shop-keepers. A little fishing is done across the harbour from the

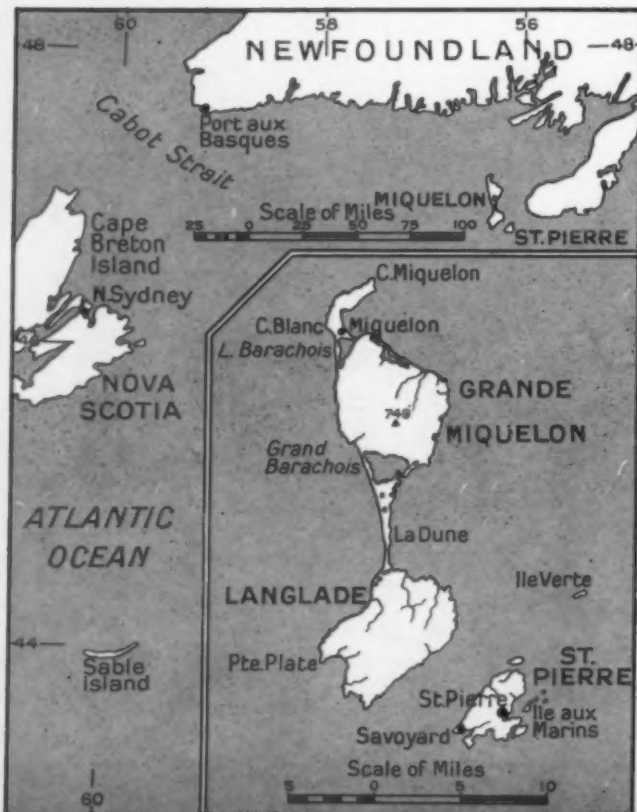
shops; a few more people are employed at the dry docks and others in the fox ranching. The island of St. Pierre, which is between four and five miles long, about three and a half miles wide, supports only one other small settlement, the fishing village of Savoyard, reached across country by an excellent road.

Miquelon and Langlade (formerly "La Grande Miquelon" and "La Petite Miquelon") are joined by a seven-mile isthmus of sand called "La Dune" and, together, are about twenty-five miles long. The only permanent settlement is the village of Miquelon which occupies one small tip and is as rural as St. Pierre is urban. The people, busy with their fishing and farming and the constant repair and painting of their colourful dories, rarely visit St. Pierre, although there is a weekly boat. Langlade, most fertile and untouched of the group, is an island of summer cottages only.

The only other inhabited island of the group is tiny Ile aux Marins, sitting haught-

With no town newspaper, St. Pierre relies on the slates outside town shops for its news. The next attraction at the moving picture house, and the date of arrival of the ship are chalked outside the store of Henri Moraze, who is also the shipping agent.





The wall of St. Pierre jail is topped with broken bottles. Crime is almost non-existent and the gendarmes have little to do.

ily aloof in St. Pierre's harbour, with its village of about a hundred fishermen—although, in the height of the fishing season, the population may more than double itself.

Boat service is maintained among the islands once a week and twice a month to east Canadian ports. When weather conditions permit, there is also air connection with Sydney, Nova Scotia, through the Maritimes Central Airways whose planes come down on the landing strip built by the Free French in 1942. Two cable stations—Western Union and a French company—provide communications, and St. Pierre's own radio station, FQM, is on the air half an hour each day.

THE POKER-FACED ISLANDS OF FRANCE

The town's "newspaper" faded away a few years ago, when the walking *tambour* who travelled the streets shouting the news at the top of his lungs found his voice wearing out. Now the news—such as the next motion picture to be shown or the expected date of arrival of the *S. S. Miquelon*—is chalked up on slates outside the stores.

News travels also, rather sporadically and with a bit of embroidery, on the Quai itself. Here, in the noon hour and after work at night, the townspeople gather to gossip. They love to gossip, and it is their worst, and almost their only crime.

The detachment of gendarmes maintained by France have little to do in St. Pierre and Miquelon, and the jail with its wicked looking wall topped with broken glass is usually empty.

The only murder committed on the islands was in bygone days. After the death sentence had been passed, the town fathers discovered that it could not be carried out because no one would act as executioner. Finally, they had to bring both the guillotine and the executioner from France—at considerable expense.

This imported executioner practised first on a goat or two before proceeding to his human victim. Only when the deed was done and justice served did he discover that the townspeople who had begged him to come now wanted nothing more to do with him. Friends snubbed him. Store-keepers would not wait on him. To avoid dying of starvation, he at last packed up his belongings and returned to France. The guillotine was dismantled and left in a government attic where, dusty and all but forgotten, it still remains.

Aside from the one murderer, the only real criminals on St. Pierre were there in ancient times, before the islands were inhabited, when France used it as a penitentiary. The old bastille still remains, but it, too, has fallen into disrepair.

Hospitality on the islands is probably unparalleled on this continent—not only

because foreign currency is so welcome, but because the islanders like people. It is as simple as that. The visitor entering a shop finds himself partaking of some rich burgundy in the shop-keeper's parlour, which usually is behind the store. Meanwhile, the family album is brought out for inspection and probably someone is playing the piano for his enjoyment.

The wayfarer who asks directions is invariably provided with a guide, although he may be going only as far as the next block. It is quite possible that the bank will present him—free—with a few new francs as a "souvenir", and that the innkeeper, showing fatherly concern over a recently acquired chest cold, will whip up some "medicine"—hot rum and white wine with sugar!

The French wines and liqueurs are of the finest quality, but, to all intents and purposes, St. Pierre's rum-running days are over, along with the Bacchanalian revels in nearby Newfoundland and the Maritimes.



Fire has repeatedly destroyed St. Pierre and it is now a law that every building must have a ladder on its roof, as exemplified by this government building.



Like the houses of St. Pierre, Hotel Robert, the town's largest hotel, presents an unpainted wooden exterior, but the interior is well furnished and meals keep up the best French tradition.

The visitor, however, still gets his drinks at seventeen cents a glass, with the best of champagne at \$3.50 a bottle and light table wine with all meals at the hotel (where inclusive rate for room and excellent board is around \$5). Drinking water comes from the ponds on top of the hills and is not recommended. When one fishing schooner headed for the cod grounds recently, it shipped on board 72 barrels of wine—and one barrel of water “for officers’ use only”.

When the rum-runners flourished in the 1920-32 period, the islands knew a prosperity greater than they had ever known before or since. It came at an opportune time, for fishing had been poor, but it presented many problems to Canadian and United States officials, who complained, finally, to France.

The people of St. Pierre and Miquelon, even when this lucrative trade was suddenly stopped, had no feeling of guilt. They had,

The little girls with the basket of French pastry are the daughters of Mr. and Mrs. René Dagort who own the Hotel Robert.

as they said, imported their liquor quite legally from France and sold it to whoever wished to purchase it. If, later, it was ferried ashore in small boats, was it any concern of theirs? It is not impossible that a little of it still goes ashore on moonless nights (Newfoundland Rangers and the Mounted Police recently stated that a ring of smugglers had been broken up) but the heyday of the rum-running is long since over.

Today, the islands, where the standard of living is still higher than in Newfoundland and in many parts of the Maritimes, look to another source for continuing prosperity. A group of shrewd business men in St. Pierre have already discussed plans for a cold storage plant and refrigerator ships to carry fish across the Atlantic. In France, they say, there is a large and non-competitive market for fresh cod. They believe that, even with an all-out effort, St. Pierre and Miquelon will not be able to supply more than one-tenth of that demand, and Newfoundland and the Maritimes may also share in the profit.

Fish has always played an important role in the economics of St. Pierre and an even



more important one in Miquelon which is essentially a fishing community. On the long, curved beach by the village of Miquelon, dozens of French dories are drawn up each evening and launched each morning. *Les doris*, as the Frenchmen call them, are a source of a good deal of quiet pride. Their owners are forever painting them a spotless white, with broad bands of red, green, blue or yellow along the flat bottoms and again along the gunwales that curve gracefully into high, pointed prows and sterns. Two men operate each, with the motor set between them. Trawler fishing has not won the popularity of dory fishing because, in the latter, the Frenchman owns his own boat, small as it is, and, being independent, he feels like a king.

A little haddock, caplin and herring is taken, but cod—as in Newfoundland—is *the* fish. Dryers exist both at St. Pierre and at Miquelon to speed up the process of preparing the fish for market.

Fish was the biggest single item of export in 1948, when export revenue reached 227,852,000 francs. Climbing steadily, it had been only 59,569,000 francs in 1946, and 159,925,000 francs in 1947.

A small side industry is beginning to bring returns to St. Pierre—the seal hunt.



One of the foxes at a St. Pierre fox ranch.

Between four and five hundred skins a year go to France, some of which return as finished articles for sale.

Fox ranching, comparatively new, is also proving a money-maker for the five or six large-scale breeders of St. Pierre. The first animals were imported from the Maritimes and Ontario, but selective breeding for pelts was carried on successfully on the islands to produce not only the familiar silvers but less familiar, more exotic furs named pearl platinum or blue glacier.

Two young foxes. Fox breeding has proved a lucrative home industry.



Imports for St. Pierre and Miquelon come primarily from France, with the exception of such things as flour, butter, cheese, vegetables and meat from Canada, preserves, meat, oranges and lemons from the United States. During the war, wines also were bought in America. Martinique sends rum in exchange for St. Pierre and Miquelon cod. The value of imports in 1948 amounted to some 226,410,000 francs.

France takes care of her last North American possessions, however, regardless of whether or not they are self-supporting. No one is allowed to go on relief. When money is running low, the government makes work and sets its unemployed men at building a new wing on the town hall, improving a school or hospital or mending roads. St. Pierre plans to erect a new power plant of 900 kilowatts as its latest venture, and one that will do away with the present 'blackout' of town lights at midnight.

A married man gets a little extra money for a job but he receives nothing at all if he is not at work. There is no such thing as unemployment insurance.

Even with government-planned schemes such as new buildings, the people of the islands find too much leisure on their hands. One of the reasons why they always win football matches with neighbouring towns is that they have so much time to practise. Matches are arranged by the A.S.S.P. (*Association Sportive St-Pierre*) which receives an annual grant of 100,000 francs from the government. Monsieur Marcel

Girardin, a minister in the General Council, is also the unofficial "Minister of Sport" for the islands.

Sun and weather are not kind to the little islands, and yet there are brief periods when the sun dances brightly on the French dories and beats down on the clean, scrubbed-looking Quai as mildly as in the gardens of France.

Fog is so frequent that they have names for the different varieties of fog—*la brume pissouse* when it is damp enough to condense on the roofs and coat collars, *la brume blanche* when it is dry, low and light, and *la brume noire* when it is opaque against a dark, cloudy sky. But always there is—*la brume*! The islands have an estimated 85 to 120 days of it each year. There is a saying, however, that "*la brume mange la neige*" (the fog eats the snow) because when it comes the snow seems to vanish.

Frequent wind, making a complete circuit of the compass in a few hours, is quite common. The French call the puffs of clouds driven before light summer winds their *moutons* (sheep) and the northern lights are their puppets, their *marionnettes*.

In spite of the weather, each home in St. Pierre has its own little vegetable patch surrounded by a picket fence whose height is limited only by the height of the uneven pickets and saplings which form it. Here a few table vegetables are grown—cabbages, onions, carrots, radishes, turnips and green peas — as well as a surprising array of domestic flowers ranging from pansies to



St. Pierre is famous for its sport and games are frequently arranged between the town and neighbouring Newfoundland teams. Here the Frenchmen of St. Pierre pose with visiting Newfoundlanders before a football match.



There has been less progress in the island of Miquelon than in St. Pierre and the older way of life prevails. Women can still be seen washing their clothes in the streams that trickle through the meadows.

hollyhocks. The French have a passionate love for their flowers and hardly a window is without its bright flower pots. According to legend, the earth in many of the gardens was brought from France, and it may be so, for it is a fact that the trees below the pioneers' graves outside St. Pierre really do grow on French soil. It was brought back as ballast by the early ships that took cod to France. St. Pierre has few other trees.

In Miquelon where soil—and strangely enough the weather too—are better, you see small-scale farms, cows wandering peacefully along the seaside meadows, goats, pigs, cows invading the main village street and wandering unmolested the length of the double row of houses. Down the very centre of this thoroughfare of Miquelon are the small squares of fenced gardens, and they are astonishingly productive.

The wooden church of Miquelon. Religious, business and social life in Miquelon is quite distinct from that in nearby St. Pierre.

Native vegetation, although stunted, grows everywhere it can get a toe hold, but has more difficulty in doing so in St. Pierre than in either Miquelon or well-wooded Langlade. The trees, mainly evergreens such as white and black spruce, with a few birch and willows, are often foreshortened on the windward side and lean like drunken men because of gales raging in from the Atlantic.





Miquelon is a town of fishermen, where dogs, chickens and even cows ramble along the streets, and the women tend their small, fenced-in gardens while the men are away with their boats.

Hunting is a popular sport in Miquelon and, although game is scarce, young men of the village ask nothing better than a day in the woods and plains of the island.



THE POKER-FACED ISLANDS OF FRANCE

Wild flowers are a mixture of arctic, temperate and sub-tropical and, considering the inhospitable weather, include an unexpected number of varieties ranging from tiny violets and several species of orchids, to pitcher plants and other carnivores of the plant world. Like the trees, they are at their best in Langlade.

Some blueberry bushes cling to the barrens above St. Pierre, but their fruit is not so lush as in Miquelon where, on a Sunday afternoon in mid-summer, it is a family pastime to go berrying along the Chemin des Roses and out toward the flat-topped hills called *Le Chapeau* (the hat). The islands also have some hundred species of mosses, as well as numerous mushrooms, seaweeds and wild fruits like raspberries and strawberries.

In the woods and meadows of Miquelon, hunters spend a good deal of their time and, although at times they actually outnumber the game, it does not seem to matter. For the sport fishermen, small brook trout inhabit the streams and sea trout with white instead of red flesh occasionally come inland.

Between Miquelon and Langlade lies La Dune which has won for the islands the grim distinction of being the "Cemetery of

Ships", just as Sable Island is the "Graveyard of the Atlantic". Over 550 wrecks have been piled up on the treacherous sandbar, most of them between 1800 and 1930, and their broken spars and hulls still litter the beach.

Islanders gather here what they call their "wood of the sea" and whatever treasures were once aboard—coal, if they were lucky, or oil or food. The floundering *Firth of Clyde* once brought them 40,000 bushels of wheat. In the grim scavenger hunts along the beach, no man touches another man's find. If one carves his initials on a hull, no other man will make off with his treasure before he himself can return and haul it away. The Dune, with its sad remnants, is like a Sahara in sand storms. Seals come there now and then to bask in the sun, and a few dandelions poke their heads up in spring—to be gathered for greens—but no one lives now on the macabre strip of land.

Fought over, bargained for, and tossed back and forth between England and France for years, this little group of rocky islands shows few scars of a hectic upbringing except for the old cannons at Pointe aux Canons, or the muzzles of others that still

Les doris, drawn up on the long beach at Miquelon, are an integral part of island life for they are used daily on the fishing grounds. The independent French fishermen prefer them to trawlers or other large boats where each would not be in business for himself.





Ancient cannon, once drawn up to defend St. Pierre against the British, are now playthings for the children.

stand on the Quai, imbedded in the cement as moorings for boats.

On his second voyage, Jacques Cartier landed in St. Pierre on June 5, 1536, before crossing to Trepassy, Newfoundland, and the event is still recorded in the islands' coat of arms. Beneath the crests of Normandy,

Brittany and the Basque country, is the *Grande Hermine* under full sail.

The first permanent fishing settlements were on the islands by 1604, and traces of the early Basques still remain in familiar names like Borotra and Jaccachury. The Treaty of Utrecht gave the territory to England, along with Newfoundland, but it was subsequently returned. It changed hands several more times before the Treaty of Paris in 1814 gave St. Pierre and Miquelon finally and permanently to France, who formally took possession two years later.

The Chamber of Commerce began to operate in 1871, and the municipal machinery was set up the following year, with the General Council three years later. The present system dates from a complete reorganization which took place in 1936, recognized three municipalities of St. Pierre, Miquelon and Langlade, and promoted the colony to the status of a territory.

Appointed in France and usually speaking French only, the head of the islands is the



The coat of arms.

Spotless white, trimmed with scarlet, the town hall is the meeting place of the General Council and of the City Council of St. Pierre. The General Council is the governing body of the islands.



governor, at present Monsieur Jean Moisset. In his absence, the acting governor, Monsieur Guy Clech, takes over. The governor heads the General Council, a group of fourteen elected members who form the

governing body of the islands and deal with administration and finance. The opening of the General Council is a ceremonial event, attended by the governor in gold-braided uniform.

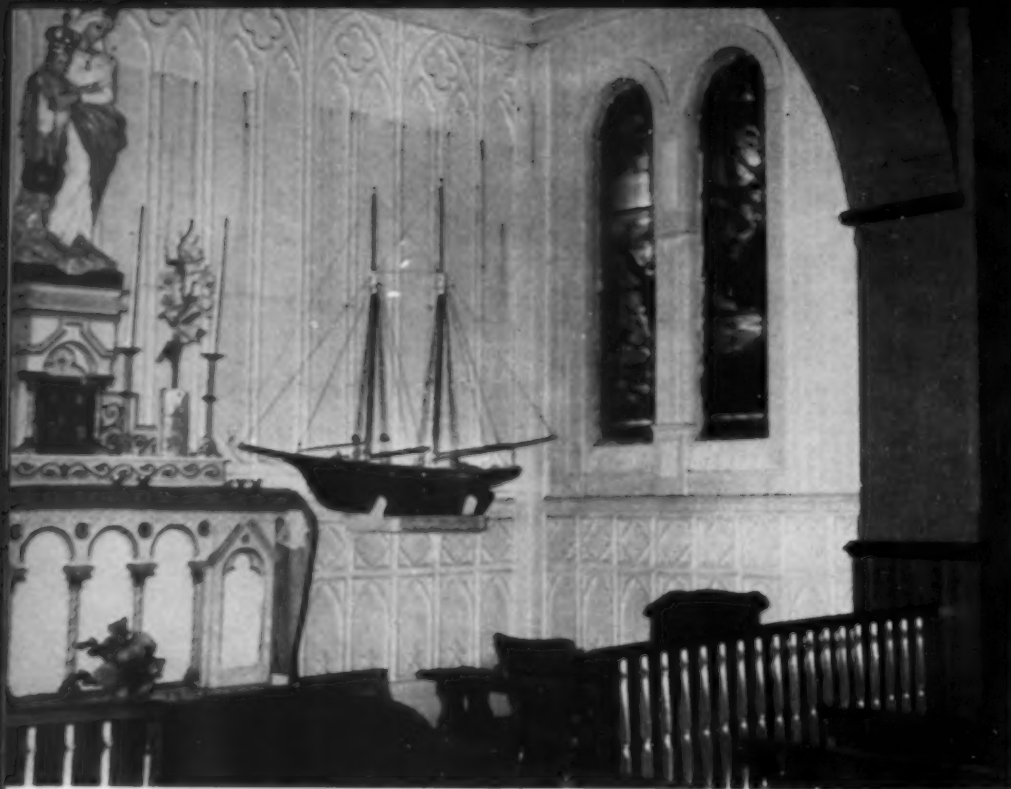
St. Pierre's city council meets in the same council chambers, under the bust representing the Republic. The mayor, Georges Daguerre, holds France's highest award, the Legion of Honour.

Politically, the little community split wide open when France went to war, and opinion ran high and bitter for and against the Free French who, finally, took over the islands on December 24, 1941. Three corvettes and a submarine came steaming into the harbour of St. Pierre that day.

Ironically, when a number of St. Pierre men went to France and tried to enlist in the army, they were sent home again because France did not feel that more men were needed. Back in St. Pierre, they did their own mobilizing in an unused warehouse, and again returned overseas as a St. Pierre regiment. Before they went, they took an oath that, if all should return, they would

Gendarmes present arms as acting governor Guy Clech leaves the town hall after a session of the General Council.





Once a year, in the spring, the model of a sailing ship is taken from the church at St. Pierre and carried to the water's edge on the shoulders of four strong men for the ceremony of blessing the waters. Similar ceremonies take place at the beginning of the fishing season on Miquelon and on Ile aux Marins where a model dory replaces the schooner model.

A statue of St. Peter, patron saint of fishermen, stands above the main door of the church at St. Pierre. It is the only church in town and is well attended.



Hillside shrines are numerous in the French islands. Brought from France and of excellent workmanship, they play a large part in the lives of the intensely religious inhabitants.

THE POKER-FACED ISLANDS OF FRANCE

erect a shrine on a hillside above the town. Every man returned, and the shrine was built, as promised.

Religion plays a big part in the life of the people. Wayside shrines, all of them imported from France and of exceptionally fine workmanship, stand on the hills above the town, and even finer work can be seen in the church of St. Pierre itself. The building is of white concrete and over the main door stands a sad-faced statue of St. Peter, patron saint of fishing the world over.

The stained glass windows were the gifts of wealthy families in France, given to Rt. Rev. Monseigneur Christophe Légasse, Prefect Apostolic of St. Pierre and Miquelon, when the original wooden church burned to the ground in 1902. Many of the statues, also, were donated and money was quickly raised in France for the rest. The interior is dominated by one impressive main altar, with half a dozen exquisite smaller chapels along the sides. In one of these small chapels is the model of a sailing ship which each spring, on the Feast of the Fishermen, is carried on the shoulders of four strong men to the edge of the sea. There, the priest blesses the sea, and asks that the coming fishing season be good. Across the harbour on Ile aux Marins, the same ceremony is

carried out with a model of a dory; in Miquelon, it is a sailing ship, but smaller than the one in St. Pierre.

Services are in French and Latin. The French language on the islands is so pure that the St. Pierrais and Miquelonais find it difficult to understand the patois of Quebec. Most of their outside contacts being with France, they have taken few foreign words into their language, with the exception of a handful dating from the rum-running day, such as "gazoline", "switch" and "starter". Less frequently, "Christmas" is used for "Noël".

The islanders habitually belittle their islands themselves. "Oh St. Pierre and Miquelon, it is a good place to visit but not to stay!" they say.

But let a visitor say the same thing and they visibly bridle. When not split over their tempests in political teapots (whether or not to have clapboards on their houses, whether or not to have a whaling station), there are no people more community minded. Their island spirit is so strong that they have a saying that they are St. Pierrais and Miquelonais before they are French.

And the little Atlantic islands with the unassuming and slightly sly air, are typically—very typically—St. Pierre and Miquelon!

The islands of St. Pierre and Miquelon have their own currency and their own postage stamps. A first day cover such as this, issued during the occupation of the Free French, is now a collector's item.





Not an illustration from "Alice Through the Looking Glass" (one searches in vain for a Red Queen on this giant chess board) but an aerial photograph of new Danish small holdings — established as a result of State loans granted towards the purchase of land and erection of buildings.

Agricultural Denmark

by V. S. SWAMINATHAN

A SMALL COUNTRY of 16,580 square miles (only half the size of Scotland and four-fifths that of Nova Scotia) with just over 4,000,000 hard-working and hospitable people, Denmark has long regarded agriculture as the mainstay of her economy.

Like eighteenth-century Britain, she was fortunate in possessing a number of enlightened landowners; when in 1784 Crown Prince Frederick acquired power by a *coup d'état* he found a valiant champion of the peasants in Christian Ditlev Reventlow (great-great-grandfather of the present Danish Ambassador to the Court of St. James), a Danish landowner who had studied agriculture in England. Reventlow was the life and soul of a commission which brought about the

liberation of the Danish serfs. Villeinage was stopped, compensation in money was paid to owners, the ancient agricultural associations were abolished, the peasant was allowed to cultivate his own plot of land—and for the first time Danish farmers came to enjoy equality of status with other citizens in matters of personal freedom and social rights. A modest obelisk in front of the Copenhagen Station was erected in 1797 by the grateful peasants in memory of Frederick, "the son of the King and father of the people", who, by his reforms, made them "wise, free and happy".

By enclosures and the growth of freehold proprietorship the Danish farmer gained economic, as well as political, freedom. The

Constitution of 1849 gave him a voice in State affairs, and the Danish Government took further steps to protect the peasants by prohibiting the merging of smaller farms and the incorporation of their properties into bigger holdings.

Education was made free and compulsory in 1814; and in 1820 the Danish Royal Agricultural Society (founded in 1769) launched a system for the practical training of young persons on large well-managed farms, a practice which still prevails. To N. F. S. Grundtvig and Kristian Kold is due the development of the democratic form of popular education—the people's high schools or "Folk High Schools". These, in addition to the agricultural schools and the splendid work done by the State Agricultural Advisers since 1860, inculcated into the minds of the Danish youth a love of the land and an awareness of the dignity of agriculture as a calling. The Danes became frequent visitors to England to learn from the famous Lawes the use of fertilizers, and from "Turnip" Townsend the cultivation of root-crops. The pioneering efforts of the Rochdale weavers at co-operation inspired the Danes to imitate the Lancastrians in the sphere of farming, and the first Danish co-operative dairy society was started in the village of Hjedding in 1882.

If Britain, with her brilliant inventors and engineers, and coal and iron in the right place, was the birthplace of the "Industrial Revolution", Denmark, devoid of mineral riches, pioneered a no less momentous agricultural revolution in the 'eighties of the last century. After losing the duchies of Schleswig and Holstein to Prussia in 1864, the Danes addressed themselves to the task of improving their standard of living. ("Lost externally, regained inwardly" became the national slogan.) In this Denmark was assisted by her central geographical location in relation to several densely-populated and highly-industrialized countries of Europe deficient in domestic food supplies. The movement of prices during the last quarter of the nineteenth century was, however, the deciding factor in developing the Danish

livestock industry. With the opening up of new grain-growing lands, animal and dairy products proved more remunerative to Denmark than the cultivation and export of cereals; while the cream separator, appearing at about this time, paved the way for co-operative handling of milk, which proved a boon to small farmers.

Modern Denmark's economic prosperity rests on the production and shipment of such items as milk (for butter and cheese), pigs, cattle and eggs. To this end the bulk of the farmland is today given over to growing animal fodder. About 38 per cent of it is grassland for pasture and hay; some 17 per cent is planted with potatoes and other root crops (the principal winter fodder for Danish cattle), and nearly 42 per cent is under grain. Coarse grain is grown on much of the grain acreage to feed cows, pigs, poultry and horses. Since the greater part of the feeding stuffs utilized in the production of livestock items is raised by the Danish farmers themselves, the size of the home harvest is of the utmost importance in relation to the quantity of output and shipments of butter, cheese, bacon, beef and eggs. Seventy-five per cent of the total area of Denmark is put to agricultural use and 85 per cent of this is under the plough. Intensive cultivation is practised in Denmark to an extent scarcely surpassed by any other country in the world. There are 209,000 holdings, which average rather more than 15 hectares (about 37 acres). Seventy per cent of the area is occupied by medium-sized farms of 10 to 60 hectares (25 to 150 acres). Work on such farms is done by the owner himself with the help of two or three young unmarried farmhands who are usually sons of other independent farmers.

While Denmark had an exportable surplus of 200,000 to 300,000 metric tons of grain in the 'seventies, by 1885 there was an import requirement of 90,000 tons. Between 1900 and 1934 imports of grain and pulse rose from 600,000 to 860,000 tons, and oil cakes and cake meal from 200,000 to 550,000 tons. Also, imports of fertilizers increased markedly. At the same time land



Autumn scene on a medium-sized farm in Zealand, largest of the 385 islands which, together with the peninsula of Jutland, make up Denmark. Some seventy per cent of the 209,000 Danish holdings are medium-sized farms, which range in area from twenty-five up to 150 acres.

was drained, limed and reclaimed on a large scale, and better use was made of farmyard manure. During this century about 1,300,000 hectares (3,250,000 acres), or two-fifths of the total agricultural area, have been so improved. These measures, coupled with better methods of cultivation, and use of superior strains of seed, lifted the total yield of the Danish harvest from an average of 33,200,000 crop units (one crop unit equals the feed value of one hectokilo, or 220.5 lb., of barley) for 1875-1884 to an average of 115,700,000 for 1934-1938 and 122,200,000 in 1945.

Denmark's basic industry is becoming increasingly mechanized. Sixty per cent of all farms have electric motors, and 80 per cent of the total grain area is sown and harvested by machinery. Threshing machines, mechan-

ically operated straw crushers and churns are now used on about 75, 45 and 50 per cent respectively of all farms. Milking machines are installed on 15 per cent of all holdings.

There was also an increase in numbers (and improvement in the quality) of livestock during the inter-war years, as shown in the following table:

	Cattle	Pigs	Poultry
1881.....	1,470,000	527,000	4,070,000
1914.....	2,463,000	2,497,000	15,150,000
1918.....	2,124,000	621,000	9,783,000
1936.....	3,072,000	3,503,000	28,569,000
1948.....	2,800,000	1,500,000	23,800,000

During the two war periods thousands of livestock had to be slaughtered because of the difficulty of procuring feeding stuffs from



Four combines, each drawn by three horses, harvesting oats on a large Danish farm. Farming (becoming increasingly mechanized) is Denmark's most important occupation and covers some seventy-five per cent of the country; of this, about eighty-five per cent is under plough.

A pleasant, half-timbered, old thatched farm in Funen, with Red Danish dairy cattle grazing peacefully in the foreground. Most of Denmark's farmland is today devoted to the growing of animal fodder and about thirty-eight per cent of this area is grassland for pasture and hay.



abroad, a fact which is reflected in the figures for 1918 and 1948. In the prosperous inter-war years Denmark boasted one cow, two pigs and seven hens *per capita*. Immediately after the last war there were only one pig and eight hens for every two persons. While the cattle population was maintained, the milk yield went down by a third because of lack of concentrates. The Red Danish milk cattle is a typical dairy breed, and is supplanting the Jutland black-and-white. To improve cattle breeding Denmark has instituted bull clubs, herd books and competition between whole herds. The control societies regularly examine individual cows in members' herds to ascertain food consumption, milk yield and fat content of milk. Denmark, by utilizing the best bulls, has been able to obtain better results from nor-

mal breeding than have other countries with artificial insemination. The first cattle-breeding society to make use of this new technique was set up in 1936. In 1944 there were 101 such societies with 58,500 members. They had 534 bulls and 344,000 registered cows. Before the war the Danish Ministry of Agriculture was empowered to prohibit marketing of beef which had not been duly controlled and stamped, and levy a slaughtering tax on all cattle killed and fit for human consumption. The proceeds of the levy were used for covering compensation and slaughtering costs of tuberculous animals, for the fight against contagious abortion and for the purchase of healthy animals for small holdings set up with State subsidy. Today the Danish dairy herds are virtually free of tuberculosis.

A small, well-kept, Danish farm — complete with guardian swan and windmill. The size of plots of the farmers in Denmark operating small holdings averages from approximately seven-and-a-half acres (the minimum that enables them to support their families) to thirty-seven acres.





In 1945 Denmark produced over 40,000 tons of cheese of many kinds, the favourite being the Danish Blue (Roquefort).

Pig production is rigidly controlled. Danish breeders concentrate on a cross between the indigenous Landrace and the Yorkshire White, combining fecundity, thrift, a long back and a light shoulder, and proving admirably adapted for bacon production. The pig population is the first to feel the shortage of feeding stuffs and shows wide variations on that account and also in

accordance with the foreign demand for Danish bacon and ham. Thus, in 1851 it was 301,000; it exceeded 1,000,000 for the first time in 1898 and reached the peak figure of 5,430,000 in 1931. The figure declined to 1,388,000 in March 1948, but in November 1949 had risen to 3,100,000. Hand in hand with the development of the pig industry went the successful production of butter, and the resulting skimmed milk formed one of the most important ingredients for bacon production.

Next to Leghorns, Rhode Island Reds and Light Sussex are the most popular types of Danish poultry. Special fattening departments and slaughteries have been established to meet the growing needs of this expanding industry. From 1933 until the outbreak of war Denmark was the world's leading exporter of eggs. Her 1939 shipments totalled 103,000 metric tons. In July 1939 she had over 33,000,000 hens and chickens; these were decimated to 10,800,000 three years later but rose to nearly 24,000,000 in July 1948. Thanks to daily egg-laying control, marking of chicks, pedigree records and progeny tests carried out over a period of years, Danish pedigree poultry has gradually made a name for itself.

Co-operation plays a crucial part in Denmark's purchase of the necessary raw materials and the collection, processing and marketing of her agricultural and dairy products for export. In 1944 Danish co-operative societies dealt with over 90 per cent of

Danish butter on its way abroad via the port of Esbjerg, each cask bearing the Lurbrand, or government guarantee. During 1948 almost 107,000 metric tons were exported (just over half of them to the U.K.), and output has since been increased. Pre-war (1935-39) average exports per annum were nearly 150,000 tons.



A dairy-maid carrying modern milk pails from the impressive cow-barn of a large farm in North Zealand. The Danish milk yield, which declined by a third during World War II, has since risen steadily. A careful check is maintained on all dairy herds, as a result of which they are now virtually free of tuberculosis.



the milk supplied to all dairies, 50 per cent of the butter exported, 86 per cent of all killings in slaughter houses, 25 per cent of the total egg shipments, 40 per cent of cattle and meat exports, 66.6 per cent of imports of foodstuffs and 33.3 per cent of the entire trade in artificial fertilizers. Co-operative dairies have enabled small farmers to obtain the same price for their minute individual outputs as that procured by larger undertakings, and they have helped to make Danish butter a product of uniformly high quality. Danish farmers also form the majority of the members of the ordinary consumer co-operatives; in 1944 there were 1,944 such organizations with 435,400 members and a turnover of Kr. 422,000,000 (Kr. 1 = \$0.16). The central co-operative bank, the fourth largest commercial bank in the country, had in the same year a share capital of Kr. 16,100,000 and an annual balance of Kr. 345,600,000.

Agriculture in Denmark is financed through the so-called credit associations. Farmers of a particular district join in an association for the purpose of getting cheaper loans. They mortgage their farms as security for the loans, and are moreover bound in *solidum* for the loans granted to other members. Money is obtained by the credit association

selling these guaranteed bonds on the stock exchange to persons or institutions wanting to invest savings. These credit association bonds are bought to a considerable extent by the 500-odd savings banks looking after the sums of small savings groups. The Danish Bureau of Farm Management and



Milk being bottled in a large dairy near Copenhagen. Ninety-one per cent of Denmark's milk goes to her 1,400 co-operative dairies.



From piglet (above) to pork (at left) — familiar plot of an old, sad Danish story. In 1936 Denmark's pig population reached 3,503,000, but was subsequently much reduced, owing to the shortage of feed stuffs. The numbers, however, have recently been boosted from 1,500,000 in 1948 to over 3,000,000 in 1949, in an attempt to satisfy the vast foreign demand for bacon and pork. Pig production is rigidly controlled; breeders concentrate on a cross between the Danish Landrace and the Yorkshire White which is admirable for bacon production. Eighty-five per cent of the total pig killings for export take place at the Danish co-operative factories, in the chill room of one of which are hung the carcasses here shown; uniform in size, all bear a guarantee stamp.

Agricultural Economics has compiled statistics indicating agricultural financial returns of farms of various sizes. The average net returns as percentage of capital for the eighteen years 1916-17 to 1933-34 in the case of small holdings were 4.7 per cent, medium holdings 5.7 per cent and large holdings 5.3 per cent.

Danish scientists have made notable contributions to improved farming and livestock. Bernhard Bang is well known for his classic study of animal tuberculosis and his success in determining the nature of contagious abortion in cattle. By seeking the cause of several animal diseases, C. O. Jensen showed the way to their cure. The labours of Storch, which included investigation into sources of fault in butter-making and cultivation of butyric acid bacteria, have proved of direct importance to animal husbandry and dairy farming. N. J. Fjord's work on milk control led to spectacular improvements in the output and quality of milk in Denmark. Above all, we are indebted to Christian Hansen for the culture of pure yeast.

The history of Denmark's basic industry had been one of steady and sustained progress but for three severe setbacks. During the first world war her economy was paralysed, and she suffered, moreover, from two successive harvest failures, to such an extent that only in 1922 was she able to regain the 1914 level of production. The second occasion coincided with the world depression, when the leading European countries embarked on a program of agricultural protection based on social and strategic considerations. The value of Danish agricultural exports declined from Kr. 1,285,000,000 in 1929 to Kr. 884,000,000 in 1932. In 1932 Germany, Great Britain, France, Holland and Belgium placed restrictions on imports of Danish agricultural products, following which Denmark felt compelled to take prompt steps to save the backbone of her population from bankruptcy and ruin. Several of the "crisis regulations" then brought into operation have since been modified by a number of new laws calculated to strength-

en and help the country's farming and livestock industry. During the second world war Denmark passed through the same difficulties that afflicted her between 1914 and 1918.

There is hardly any country in the world where the working classes live under better conditions than in Denmark. This Scandinavian democracy has come close to realizing the ideal Bishop Grundtvig put forward a century ago of a country where "few have too much, and fewer too little". An Old Age Pension Law was introduced in 1891, and a Health Insurance Law the following year. In 1899 an important law for the establishment of small farms with State help was enacted. Altogether public authorities have supported the creation of 25,000 small holdings, while quite a number have come into being through investment of private capital. Before the war Denmark enjoyed the greatest *per capita* foreign trade of any country.

Agricultural products represented 73 per cent of the value of her export trade in 1936 (bacon accounting for 28.6 per cent, dairy products 25 per cent and eggs 8.4 per cent). In that year 56 per cent of Danish exports went to Great Britain, and 21 per cent to Germany.

Commercial relations between Denmark and Great Britain have their roots deep down in history. As early as the eleventh century Danish merchants had their "Company" in London with their own "Hall" and church, St. Clements Dane in the Strand. Danish agricultural exports to Britain, however, assumed importance only after the abolition of the Corn Laws in 1849, and dairy products and bacon loomed large following the 'eighties. Imports of reasonably priced Danish food products were a factor in strengthening Britain's competitive position in world markets.

Before the last war Great Britain and Germany took at least 75 per cent of Denmark's exports and furnished 60 per cent of her imports. But Great Britain, Denmark's best customer, came out of the war impoverished, and Germany, her second-largest buyer and supplier, was in an even worse



A lecture being delivered in one of Denmark's sixty Folk High Schools. To N. F. S. Grundtvig (whose portrait appears in the background) and Kristian Kold is due the development of this democratic form of education. In summertime the young women attend these schools; and during the winter, when work in the fields is suspended, the young men flock to their classrooms.

predicament. It is not surprising that these countries combined took less than 24 per cent of Denmark's exports and accounted for only 25 per cent of the latter's imports in 1947. Also, the share of agricultural products in Denmark's exports fell from 71 per cent in 1938 to less than 60 per cent in 1947. The new trade agreement concluded with Britain in February 1948 accorded a much-needed increase in the price of Danish agricultural exports, bringing them more in line with production costs.

Denmark's agricultural shipments (distinguishing those consigned to the United Kingdom) in recent years are given in the table at the end of this article.

Prospects for the Danish economy depend on both internal and, to a major degree, external factors. Even before the war Denmark had a considerable dollar deficit. For 1938 her total deficit in trade with the Western Hemisphere was about Kr. 160,000,000 (Kr. 670,000,000 in terms of 1947 prices). Then she had a still larger surplus of sterling which was freely convertible into dollars. Two factors have placed Denmark's economy in a worse predicament now than before the war: i.e., her increased need to import from the New World (because of the inability of Great Britain and Germany to meet her requirements), and suspension

by the United Kingdom of the convertibility of sterling into dollars. Denmark is hence striving to export more to the New World and import more from outside the Western Hemisphere. The most she can do is reduce the 1947 dollar deficit from about 'Kr. 660,000,000 to around 240,000,000 in 1952-53, assuming she exports 20,000 tons of fresh butter to the Western Hemisphere. For Denmark's economy to function satisfactorily, some convertibility of sterling into dollars is essential.

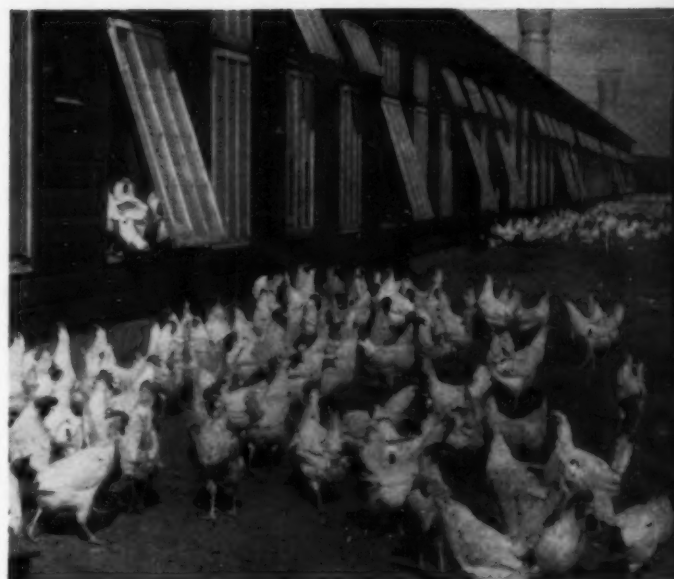
Like other countries participating in the E.R.P., Denmark has drawn up a four-year plan; under it national production, which



Denmark, by utilizing prize bulls, has obtained better results from normal breeding than have many countries from artificial insemination.

in 1947 amounted to Kr. 18,000,000,000, should rise by 1951-52 to Kr. 19,800,000,000. Consumption is expected to remain stable at Kr. 15,200,000,000, while national investment is to be increased from Kr. 1,000,000,000 in 1947 to Kr. 2,200,000,000 in 1951-52. The estimated increase in gross national production, expected to rise 14 per cent between 1947 and 1952-53, is largely based on an expansion of agricultural output, which is at present still far from being fully exploited. Danish agriculture could, it is reckoned, produce Kr. 1,000,000,000-worth more food. Industry and handicraft are also expected to make their contributions, partly by increasing capacity, but mainly by stepping up output per man-hour. By 1952-53 Denmark aims at raising imports 50 per cent and exports 75 per cent above the 1947 level.

That attainment depends, however, on the international situation, the state of world prices, the economic recovery of other countries, the import policy of the United States, continuance of Marshall Aid, possibility of increased trade with Eastern Europe and Latin America, and Great Britain's ability



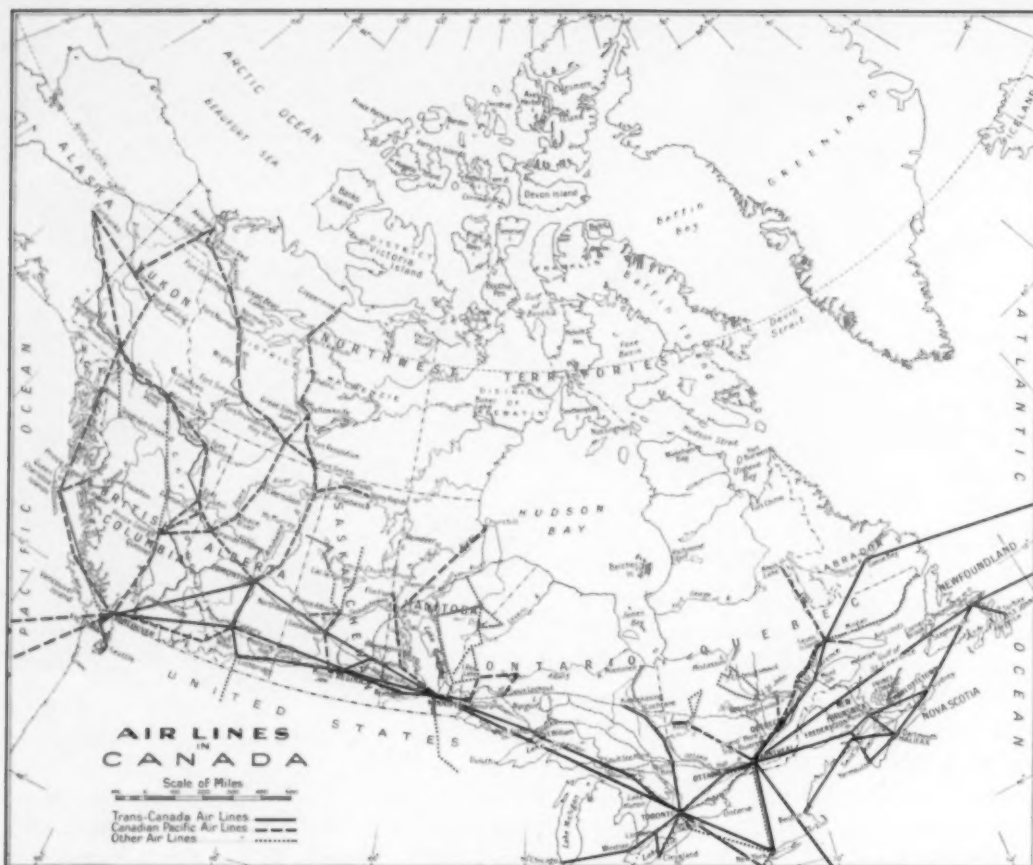
White Leghorns, the most popular type of hen in Denmark. From 1933 to 1939 this country was the world's leading exporter of eggs.

to resume convertibility. Denmark, like Switzerland, cannot exert any influence on these external factors. But so far as internal conditions are concerned the possibility of reaching her targets appears promising.

		1935-39 (Average)	1946	1948
Butter	(metric tons)—Total	149,067	77,482	106,071
"	(" ")—To U.K. only	111,426	47,931	54,389
Bacon and pork	(" ")—Total	185,107	62,568	41,257
"	(" ")—To U.K. only	181,400	49,549	25,412
Eggs	(" ")—Total	87,266	19,937	40,374
"	(" ")—To U.K. only	61,482	15,826	32,623

A Danish co-operative dairy; the first was started in 1882, and the movement has since grown to cover nearly every phase of agriculture. Co-operation plays a vital role in Denmark's buying of raw materials and in the collection, processing and marketing of her agricultural products for export—ensuring a fair price to the small farmer, and guaranteed quality to the purchaser.





Canadian Geographical Journal map

The Expansion of Aviation Into Arctic and Sub-Arctic Canada*

by J. A. WILSON

CANADIANS responsible for the development of Northern Canada had watched with increasing interest the constant and rapid growth in efficiency of the Air Services during the first World War. The greatest handicap to their work in the past had been lack of adequate transportation. There were no roads or railways north of the Saskatchewan River. There the historic means of transportation, canoe in summer and snowshoe and dog-team in winter, still reigned supreme. Men of vision saw in the aeroplane an answer to their problems; given an aircraft with a reliable engine capable of carrying a payload of a few hundred pounds, in addition to its crew, and fuel for a few hundred miles,

their problem was solved. High speed was not essential but rugged construction and simplicity of operation were necessary.

At the time of the Armistice in November 1918 there were no flying facilities in Canada except the two seaplane stations at Dartmouth and Sydney, Nova Scotia, built in 1918 for anti-submarine patrols off the Atlantic Coast, and a few aerodromes built by the Royal Flying Corps in Ontario for the training of the hundreds of young Canadians who had volunteered for the Air Services during the war. Aircraft were not lacking, as the United Kingdom after the Armistice had made a generous donation to Canada of more than 100 planes of various

*Published by permission of Dr. V. Stefansson, Editor of the *Encyclopedia Arctica*

THE EXPANSION OF AVIATION INTO ARCTIC AND SUB-ARCTIC CANADA

types and much miscellaneous equipment and spare parts. In addition, the U.S. Naval Air Service, which had manned the seaplane bases on the Atlantic Coast, on withdrawal had left the stations more or less intact and with their full complement of H.S.2L flying boats and equipment. These were found to be invaluable and were used in the postwar civil flying operations for many years. Fortunately Northern Canada abounds in lakes and rivers which provide landing places for seaplanes and flying boats in summer and runways for aircraft on skis in winter. These factors made the construction of airports throughout the North (economically impossible in the pioneer stages) unnecessary. The only drawbacks to the use of floats in summer and skis in winter were the annual periods of "freeze-up" and "break-up" in autumn and spring when neither was usable. This handicap was willingly accepted in the early years before traffic was well established; it applied equally to all forms of transportation.

Canada was fortunate in having at its disposal hundreds of pilots and mechanics who had served their apprenticeship during the war and asked for nothing better than to continue their careers in aviation.

A rapid survey during the winter of 1918-19 of possibilities for the development of flying in Northern Canada showed that enthusiastic co-operation would be forthcoming from the Forest and Survey Services,

mining interests and all those engaged in northern development. The Air Board Act, providing for the establishment of air services, civil and military, and for the regulation of civil aviation in Canada, was passed in June 1919. The stage was then set for the orderly development of aviation throughout the Dominion.

Early Trial Flights

The first experimental trials of flying over the northern forested regions were made from Grand'Mère, Quebec, in August and September 1919 under the auspices of the Dominion Government which lent three H.S.2L flying boats. The Provincial Government of Quebec made a substantial grant towards the expenses of the experimental flights and the Laurentide Pulp and Paper Company undertook responsibility for the organization of the base facilities, the forest observers and other personnel. Stuart Graham, later Superintendent of Air Regulations, Department of Transport, was the pilot. The success of these experimental flights led to the establishment in 1920, with the co-operation of the Forest and Survey Services, Dominion and Provincial, of air bases at Vancouver, B.C., High River, Alberta, and Roberval, P.Q., for further trials of forest fire patrols, survey work and transportation in the more inaccessible parts of the country adjacent to these bases. In 1921 the Province of Ontario assisted in the establishment of a base at Sioux Lookout in

H.S.2L flying boat over a forested area. It was used in pioneer operations throughout Ontario and Quebec for forest fire patrol, forest sketching, photography and freighting.





Vickers Vedette. A light flying boat used largely for oblique photography and forest fire patrol in Northern Canada. This one on Great Bear Lake is moored to ice on the eastern shore in July.

R.C.A.F.

Northern Ontario for similar work and three further bases were established in Manitoba for work in the forested areas surrounding Lakes Winnipeg and Winnipegosis. These experimental flights served not only as practical full-scale demonstrations for the Forest and Survey Services but also showed the possibilities of using aircraft for the opening up of the remoter parts of Northern Canada.

First Flights in Mackenzie Basin—1921

In the fall of 1921 the Imperial Oil Company brought in the first producing well in the now famous Norman Wells field. Water transportation had ceased and it was urgently necessary to provide some means of transportation between the new find, 1,200 miles from the railway and only a short distance south of the Arctic Circle, and civilization. Junkers all-metal seaplanes were purchased and operations were started from the railhead in the Peace River country. In spite of innumerable difficulties with equipment, unknown and unforeseen hazards, blizzards and low temperatures, after many delays two of the aircraft made the trip and returned safely to civilization. Gorman, May and Fullerton were the pilots. This pioneer effort showed the impossibility of conducting regular air

services without adequate ground facilities, refuelling caches, spare parts and marked runways on the ice.

Arctic Reconnaissance—1922

In the spring of 1922 the Canadian Government, recognizing the need for effective occupation and development of the Arctic Archipelago if it hoped to maintain sovereignty there, decided to establish police posts in the far North as bases for the further development of the country. The Northwest Territories Branch of the Department of the Interior was placed in charge of the project. Recognizing the importance of aerial observation in preliminary exploration work and mapping, and the possibilities of intercommunication by air between any posts established, they asked for the co-operation of the Air Board in the project. Before actual flying operations were undertaken, it was decided as a first step to make a reconnaissance of the climatic and physical conditions to be met in these areas of which little was known. This task was given to Squadron Leader R. A. Logan who was specially well qualified for the work. Before the war he had worked as a Dominion Land Surveyor in Northern Canada and was familiar with Arctic con-

THE EXPANSION OF AVIATION INTO ARCTIC AND SUB-ARCTIC CANADA

ditions. He had also made special studies of navigation, meteorology and radio.

The expedition was carried in the government steamer *Arctic*, a veteran in Arctic exploration under Captain Bernier. The expedition left Quebec on July 18th and returned safely on October 2nd after visiting Baffin, Bylot, North Devon and Ellesmere Islands and establishing three posts in the far North. Logan presented a comprehensive report dealing with aviation in the Arctic generally, the uses of aircraft in the far North, the most suitable types for use there and the ground facilities necessary. Questions of transportation, fuel, food, clothing and other supplies were fully covered. Much valuable information was obtained on ice and climatic conditions in the districts visited. He recommended that should the Government decide to proceed with a program of further development a small party consisting of two pilots and two mechanics with two small specially equipped aircraft should accompany the next expedition, establish an air base, conduct flying operations at all seasons of the year and keep meteorological and other pertinent records. A comprehensive knowledge of the actual conditions to be encountered could thus be

obtained so that operations on a larger scale might be inaugurated in subsequent years should conditions be found suitable for flying during a considerable portion of the year, as was confidently anticipated. Unfortunately a change in the direction and policy in aviation following on the absorption of the Air Board's work by the Department of National Defence in 1923 prevented any further work on these lines being carried out until twenty years later when, under pressure of war, the expansion of aviation in the far North became necessary once more.

Pioneer Commercial Flying

The pioneer demonstrations of the Dominion Government outlined above rapidly began to bear fruit. Commercial companies were formed to undertake forest fire patrols, air surveys and photography, and the transportation of men and supplies from the railroad to serve mining camps and prospectors working all through Northern Canada. Aircraft soon penetrated into the interior of northeastern Quebec and Labrador as far as the Hamilton River, in Northern Ontario as far as James Bay, from Lake Winnipeg north to the Churchill River and Lac la Ronge, from Edmonton into the Peace River district and down the Mackenzie River. Gradually



The Ford tri-motor plane that carried the first air mail to the Yukon in 1937. The original trip took more than three times the time now required to cover the same route.



Vickers Viking Amphibian. This was the first aircraft to be built in Canada in the inter-war period; it superseded the H.S.2L.

a chain of bases and refuelling depots was built up all through the North to serve the new traffic.

By 1927 new types of aircraft based on northern experience had come on the market. Cabin, high-wing aircraft with aircooled radial engines were particularly suitable for northern operations. They were adaptable for either float or ski undercarriage. Fairchild and Fokker types came into common use, supplemented by the rugged all-metal Junkers low-wing seaplane, and Bellanca and Stinson single-engined aircraft, followed later by smaller cabin types such as the Waco and Beechcraft. By 1928 air services were available all through Northern Canada. Weather and radio services were steadily improving and companies were establishing their own facilities to supplement those of the Government where necessary.

Air Surveys

Another factor of great importance was the mapping program of federal authorities. In this the Air Force and the Survey Services of the Department of the Interior and the Geographical Section of the General Staff co-operated; the Air Force did the flying and photography while the Survey Services supplied the ground control, plotted the information from the pictures and produced the finished maps. Each year after 1921 saw an increased program of photographic surveys undertaken. The resultant maps facilitated

air navigation and were invaluable not only to the pilot but to the geologist, the prospector and the forester. The early survey programs in the far North were concentrated on the production of reliable maps of the most travelled water routes and of the areas most promising for mining development. So successful was this program and so essential the photographs and maps to the work of northern development that within a decade no geologist or prospector would examine any area without first having photographs and maps of the terrain.

Air Mail Contracts

The federal authorities also supported the infant industry by letting contracts for the regular and frequent carriage of mails by air from the railway to the mining camps now being established all through the North, and to the older police and trading posts which hitherto had been dependent on slow and infrequent mails carried at great cost by water or dog-team; thus a regular revenue was assured to the pioneer companies.

The story of this expansion from meagre beginnings is a tale of strenuous work by pilots and mechanics struggling with determination against odds which would have daunted all but the hardest spirits. Their enthusiasm knew no bounds. Their belief in aviation and its progress was the gospel which buoyed them up through blizzards and strandings.

Fairchild 51 "Razor Back". Single-engine float type used for freighting and fire prevention in the North.



Steady Progress in Northern Expansion

Progress in the aviation and mining industries went hand in hand in Northern Canada during the 1920's and 1930's. As experience was gained of the difficult operating conditions and as more efficient aircraft became available, the scope of the prospector and mining operator increased with the growing reliability of the services, heavier pay-loads and longer ranges. From bases at Roberval and Seven Islands, H. S. Quigley and F. V. "Turk" Robinson explored the country to the north of the shore of the Gulf of St. Lawrence back into the valley of the Hamilton River and into the regions of the great new iron finds of the Labrador; D. S. Bondurant finally penetrated as far as Fort Chimo on the south shore of Ungava Bay.

Kenneth Saunders, pioneer photographic pilot in Canada, opened up the country north of Lake St. John as far as Lakes Chibougamau and Mistassini in northern Quebec. J. Scott Williams and Roy Maxwell pioneered regular air routes into Rouyn in 1924, and in 1925 the new Red Lake mining camp was discovered and immediately became the centre of much flying activity based at Hudson and Sioux Lookout on the railway. J. V. Elliott, "Doc" Oakes and Rob Starratt played a leading part there. In 1926 a winter expedition penetrated into James Bay as far as Richmond Gulf under Oakes and T. M. "Pat" Reid. 1927 saw Oakes freighting drilling equipment to the site of the new harbour at Churchill. Far to the west similar operations were beginning in northern Brit-

The Canso Amphibian is largely used for search and rescue work and mercy flights to the far North by the R.C.A.F.





Watson Lake, Yukon Territory, showing landing strip built across projecting point of land.

ish Columbia. Scott Williams spent the summer of 1925 based at Lower Post on the Liard River serving a prospecting party working in that then remote area as far north as Frances Lake. G. A. Thompson was similarly employed in the Cassiar district from a base at Hazelton, B.C. In 1926 "Cy" Caldwell, who had been with Williams on the Liard the previous year, took his Vickers Viking into the Slave Lake district on mining exploration, thus reviving activity in the Mackenzie Basin, dormant since 1922. Similarly in northern Manitoba and Saskatchewan prospecting was active and air transport services found a new opportunity in the opening up of the Flin Flon area.

The mining community in Canada was now fully aware of the advantages of air transport and willing to finance operations by the purchase of better aircraft with longer range and greater pay-load. Northern Aerial Minerals Exploration, Dominion Skyways, the Nipissing Company and Cyril Knight led major air prospecting ventures into the Northwest Territories, including the Barren Lands and Hudson Bay coasts, in 1928 and 1930. The Consolidated Mining and Smelting Company maintained a fleet of aircraft

to support their prospecting parties in the North. By 1928 it could be confidently stated that no spot on the mainland of Canada was inaccessible. Aircraft had penetrated into the remotest districts of the Yukon, northern British Columbia and the barren grounds of the Northwest Territories as far as the Boothia Peninsula and the shores of Hudson Bay. In addition to the pioneer pilots mentioned above, those most active in opening up this vast hinterland, virtually inaccessible until the advent of aviation, were Leigh Brintnell, W. R. May, "Punch" Dickins, Jack McDonough, Bill Spence, Bill Sutton, Grant McConachie, Walter Gilbert, Mat Berry and many others.

The Hudson Straits Expedition—1927-1928

Following the decision of the Canadian Government to complete the Hudson Bay Railway and the terminal on the Bay, it was decided in January 1927 to send an expedition to Hudson Straits "to obtain accurate information on ice conditions in the Straits and study requirements necessary to insure safe navigation". The co-operation of the R.C.A.F. was asked and it was decided to establish three air bases in the area, one near each end of the Straits and one half way

THE EXPANSION OF AVIATION INTO ARCTIC AND SUB-ARCTIC CANADA

between these points, and to maintain, as far as weather conditions would permit, daily patrols from each to observe ice conditions over a period of sixteen months. It was decided to equip each base with two Fokker Universal aircraft (fitted with ski, float and wheel undercarriages), a thirty-foot motor launch, a Fordson tractor, seven buildings including hangars and a radio station, and all stores and equipment necessary for the maintenance of the base for the period of occupation. Squadron Leader (now Air Vice-Marshal) T. A. Laurence was given command of the expedition.

On July 17th the freighter *Larch* and her escort, the *Lady Stanley*, one of the smaller government icebreakers, left Halifax. The thirty-nine members of the expedition and a Moth seaplane (for reconnaissance purposes) were carried on the *Lady Stanley* while the construction crews travelled on the *Larch*. The bases were successfully established during the summer at Port Burwell, Wakeham Bay and Nottingham Island. Flying was started at all three bases by the middle of October when the first signs of ice appeared. Radio communications were efficient, contact being maintained at all times with planes in the air, with other bases and, through relay stations, with Headquarters in Ottawa and the Meteorological Office in Toronto.

At the completion of the expedition a vast amount of information was gathered from the logs of the ships and the bases concerning the movement of the ice in the Straits, the incidence of fog and poor visibility due to

snow, the opening and closing of navigation, and the aids to navigation which would be required for further operations. Air patrols were found possible throughout the year with only occasional interruptions caused by bad weather. The expedition returned to Quebec in November 1928 and a full report was subsequently published by the Department of Marine.

Consolidation of Services

Active mining at Eldorado, the radium find on Great Bear Lake and the gold camp at Yellowknife made new openings for regular air services. The heyday of the pioneer pilot flying his own ship gradually passed with the consolidation of services and companies into larger commercial units, doing away with cut-throat competition and ensuring better service through firmer finances and better aircraft. In 1937 Trans-Canada Air Lines began their operations on the trans-continental route leaving the northern services to continue their work as feeders. By 1941 these were gradually absorbed into Canadian Pacific Air Lines who now control most of the regular scheduled routes outside of the Trans-Canada airway, and its main connections to points in the United States. Many independent operators continue their work throughout the North on a charter basis.

Aerodrome Construction in the Arctic and Sub-Arctic

With the growth of population in northern mining camps the demand for more efficient air services became insistent. On the main traffic routes to the far North the length of the "freeze-up" and "break-up"

Goose Bay, Labrador, stopping place for many transatlantic flights; triangular runways may be seen in the background.





A dragline in operation at Whitehorse airport, Yukon. Houses for airport employees are under construction in the background.

N.F.B.

periods was serious. On the shorter runs where there was little difference in latitude these periods were short; but as the length of the air routes increased, the stoppage of all flights from this cause became intolerable. Ice disappeared at Edmonton early in April but Bear Lake was still ice-bound in July. The increase in traffic called for more regular, efficient and uninterrupted service.

In 1937-38 Canadian Airways advocated a chain of landing strips from McMurray to the Arctic Coast along the Mackenzie River. Yukon Southern Airways had made surveys on their air mail route from Grande Prairie to Whitehorse, with strips at Fort St. John, Fort Nelson, Watson Lake and Whitehorse. Pan-American Airways, who had been granted landing rights on their route between Juneau and Fairbanks, Alaska, had already graded a strip at Whitehorse with the assistance of the Territorial Government of the Yukon and the Department of Transport, to accommodate the twin-engined transports. Similar work had also been done at Burwash Landing, at Dawson, at Mayo Landing, and at several other points on the railway between Whitehorse and Dawson by the Territorial Government. Yukon Southern Airways had cleared and graded strips at Fort St. John and Fort Nelson

while Canadian Airways had made some progress on the clearing and grading of a strip at McMurray on the Mackenzie River route. Progress was slow, however, owing to the lack of funds and difficulty of moving heavy grading equipment into these remote districts.

The Northwest Staging Route

In 1939 the Department of Transport, recognizing the future importance of the air route to Alaska from the commercial and strategic points of view, obtained authority and funds for a complete airway survey of the route from Edmonton to Whitehorse via the valleys of the Peace, Liard and Yukon Rivers. It was the logical route to Alaska and the Orient. It lay east of the Rocky Mountains, passed over relatively easy terrain and was climatically preferable to any other route, having a moderate snowfall and freedom from fog at all seasons.

Construction During the War

Preoccupation with the construction of aerodromes for the Empire Flying Training Plan during the first two years of the war diverted attention from northern development but with the entry of the United States into the conflict in December 1941 the need for action again became most urgent. Fortunately the Joint U.S.-Canadian Defence

THE EXPANSION OF AVIATION INTO ARCTIC AND SUB-ARCTIC CANADA

Board appointed in 1940 had given early attention to the need for better communication with Alaska, and had urged the immediate construction of the Northwest Staging Route from Edmonton to Fairbanks. By strenuous efforts the main fields on this route at Grande Prairie, Fort St. John, Fort Nelson, Watson Lake and Whitehorse were completed by September 1941 under contracts let by the Department of Transport and maintaining a steady flow of reinforcements to the U.S. Air Forces in Alaska was comparatively simple. During the next three years the route was greatly enlarged, new intermediate fields and radio ranges were added, and the difficulties of transport solved by the completion of the Alaska Highway which gave access to all aerodromes. The construction and early completion of the highway was made possible by the existence of the airway.

The Canol Project

The decision to exploit to the full the Norman Wells oil field caused a similar revolution on the Mackenzie River air route. The demands of the traffic were far beyond the capacity of the seaplanes previously used, and the construction of a chain of full-scale air bases was rapidly undertaken by the U.S. Forces, with the approval and assistance of the Canadian Government. Nowadays traffic moves into Norman Wells and Yellowknife in D.C. 3's and from there is distributed by seaplane to outlying points.

The Trans-Atlantic Ferry Route

On the Atlantic Coast similar action was being taken to improve the communications by air across the Atlantic. The Department of Transport was authorized to construct new bases at Montreal, Mont Joli, the Saguenay and Seven Islands, Quebec; Moncton, New Brunswick; Sydney, Nova Scotia;

Transatlantic flight completed. Capt. A. S. Wilcockson, Commander of the Empire flying boat Caledonia, has landed his four-motored plane on the St. Lawrence River near Montreal. Photograph shows (l. to r.): Commander C. P. Edwards, Chief of Air Services; T. A. Vallette, Wireless Officer, Caledonia; Captain Wilcockson; S. J. Hungerford, President Trans-Canada Air Lines; C. H. Bowes, First Officer, Caledonia; T. E. Hobbs, Wireless Officer; and J. A. Wilson, Controller of Civil Aviation.

T.C.A.





Left:—Four-engined North Star aircraft, used for long distance transportation in northern Canada.

Right:—Dakota or D.C.3. Douglas passenger aircraft used throughout Canada and the United States and many other countries.

Tor Bay, Newfoundland; and Goose Bay, Labrador, while Gander airport was greatly enlarged. The United States Government was also authorized to build airports for its own Services at Mingan, Quebec, and Stephenville and Argentia, Newfoundland. These new bases added greatly to the efficiency and safety of the trans-Atlantic ferry system and the anti-submarine patrols off the Atlantic and Gulf of St. Lawrence coasts. In addition they served the important purpose of providing staging aerodromes for the service of the aerodromes built in Greenland and Iceland by the U.S. Forces.

The "Crimson" Route

Later in the war the United States Government was given authority to construct with its own Forces a further chain of bases in Northern Canada known as the "Crimson" route, a staging route to provide the shortest journey from Los Angeles, California, to northern European points by short hops. Bases were constructed at Churchill, Manitoba, Southampton Island and Frobisher Bay, Baffin Island and Chimo, Quebec. In the final settlement of the war accounts between the two governments Canada paid the United States \$76,000,000 for the work done on the "Crimson" route and resumed control of all bases in Canadian territory. Though never used as a staging route these bases have been invaluable in the postwar period as stepping stones for further development in the far North, as meteorological stations, as bases for the air survey of the Arctic Islands, and as staging

bases to aerodromes at still more remote meteorological and scientific stations now being established to give efficient coverage all through the Arctic Archipelago, and to similar joint U.S. and Danish bases in Northern Greenland. Landing strips have already been built at Baker Lake, Eureka Sound, and Cornwallis Island. It is now proposed to build a strip near all meteorological stations established there, thus bringing to completion the ideas originally put forward in 1922 when the Air Board sent R. A. Logan to make a reconnaissance for this purpose.

Exercise "Musk-Ox"

During Exercise "Musk-Ox" in the winter and spring of 1946 (a joint exercise by the Canadian Army and the R.C.A.F. to test the possibilities of moving men and motorized transport in the Canadian Arctic) the moving force was supplied by air during its entire journey of 3,000 miles from bases at Churchill, Yellowknife and Norman Wells. During the last two winters numerous mercy flights to evacuate sick or injured persons from remote areas (in which connection the work of Saskatchewan's Department of Health air ambulance service has been outstanding) have been made possible by the use of the new bases; and the construction and supply of the remotest meteorological stations have been greatly facilitated.

Summary

The above brief account shows the gradual expansion from small beginnings of flying in Northern Canada. Progress has been steady throughout the years. The forester and sur-

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veyor were the leaders in 1919 followed quickly by the prospector and mining operator. Aviation and mining went hand in hand during the 1920's and 1930's. With the increase in efficiency of the flying services the range of prospecting and mining extended ever further into the North. The war brought a revolution in methods and saw the aerodrome system extended into the far North. Today it is possible to travel to the Arctic Coast of Canada, to the Arctic Archipelago and to Alaska with equal safety and comfort in the same types of twin and four-engined planes; with equally efficient radio aids to navigation and meteorological services, and ground facilities comparable with those in

common use between Toronto and Montreal or New York and Chicago. Journeys which previous to the advent of the aeroplane took months and even years of arduous travel are now accomplished with ease and comfort in a few hours. The isolation and solitude of the Arctic are things of the past! With regular air mails, radio, and supplies of fresh provisions, life in the Arctic has assumed an entirely different complexion. The effect on the native inhabitants is the subject of anxious concern to all interested in the North. Steps must be taken to ensure that their lives and welfare are protected, and that they benefit from the advances which science has brought to the Arctic.

Noorduyn Norseman. The work-horse of the North, still largely used for freighting on floats, skis or wheels in the mining areas, and for search and rescue work by the R.C.A.F. and U.S. Army Air Services.

N.F.B.



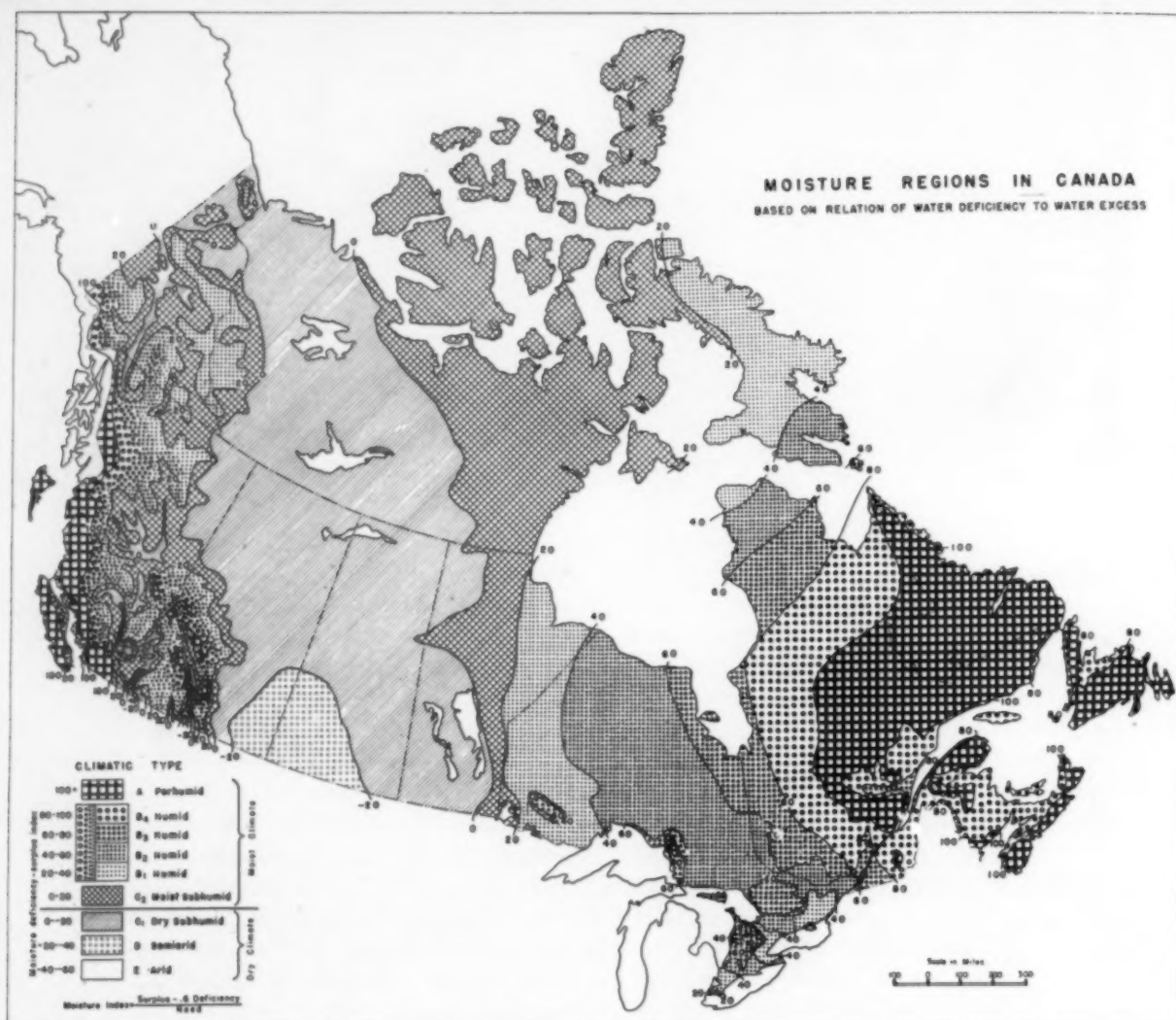


Fig. 1

Is Canada's Northwest Subhumid?

by MARIE SANDERSON

IN 1948, C. W. Thornthwaite published a classification of climates¹ based on the concept of water need, or to use its proper scientific name, "potential evapotranspiration". By comparing need with precipitation at any locality, it is possible to determine whether there is too much water or too little and how great the surplus or deficiency is.

The Thornthwaite method was applied to all the Canadian weather stations to obtain the map of the climatic regions shown in

Fig. 12. The north-south trend of the lines in central Canada and the large area classified as subhumid in the northwest are in marked contrast to earlier climatic classifications. According to popular concept, the northern regions of North America are divided into a series of latitudinal or east-west belts of climate, vegetation and soil. It has often been said that although precipitation is low in northwestern Canada, the need for water is low and a humid climate results. Nevertheless, the Thornthwaite classifica-

tion indicates that the water need or potential evapotranspiration in the northwest is high and a subhumid climate results. Recent observations on crop production and soils, and actual climatic experiment in the area substantiate this statement.

Observations on Crop Production

Most writers speaking of the growing of crops in the sub-Arctic regions mention the rapid growth during the long daylight hours of summer, and the ever present hazard of frost. However, a fact which is more rarely mentioned is that precipitation is not always adequate for crop growth and summer drought is also a factor to be considered. A search through official reports on crop production reveals the following.

Vegetables are the chief agricultural crop and gardening is carried on in the alluvial lowlands along the Mackenzie River and in isolated localities on the Alaska Highway. At Fort Smith (60° N.), on the Slave River at the southern border of the Northwest Territories, there is an experimental substation. Reports covering six years indicate that production was invariably limited by deficiency of moisture³. Dr. J. W. MacEwan, Dean of Agriculture at the University of Manitoba, stated in a letter to the writer that the driest and dustiest country he recalls seeing was around Fort Smith. Another agriculturist viewing the region in 1944 reported that the area suitable for cultivation would require considerable additional moisture to produce satisfactory gardens, but he concluded that "irrigation here on a large scale is impracticable"⁴. In reports for Fort Resolution (61° N.) dry weather rather than frost damage in six out of eight years is

mentioned as the factor limiting crop production. At the experimental substation at Fort Providence (61° N.) the hazards to agriculture are listed as long winters, short summers, and scanty rainfall; throughout the summer of 1938 no rainfall was heavy enough to penetrate the ground more than one inch. Fort Simpson, on an island in the Mackenzie River at about 61° N., has been considered by many writers the northern limit for successful cereal-crop production. Agricultural experiments begun on the island in 1941 indicated that drought was a factor to be combated⁵. At Norman Wells (65° N.) production of vegetable crops from the Imperial Oil gardens is high, and lawns flourish, largely because constant irrigation with modern spray equipment is carried on. Fig. 2 shows a section of the gardens at Norman Wells being irrigated.

The only experimental evidence on crop production in the upland areas of the northwest is furnished by recent plantings along the Alaska Highway. Growers in the area reported that the summer rain was sometimes insufficient and that it was necessary to pump or carry water from the rivers⁶. From his exploratory soil survey along the water routes of the Northwest Territories to Aklavik in 1945, Leahey concluded that drought is the most serious factor limiting crop production⁷, and that in his opinion the climate for farming is no better than dry subhumid to semiarid.

Observations on Soils

Soil surveys in the Canadian northwest are still few in number and widely scattered, but even the few observations that have been made raise doubts regarding the east-

Fig. 2



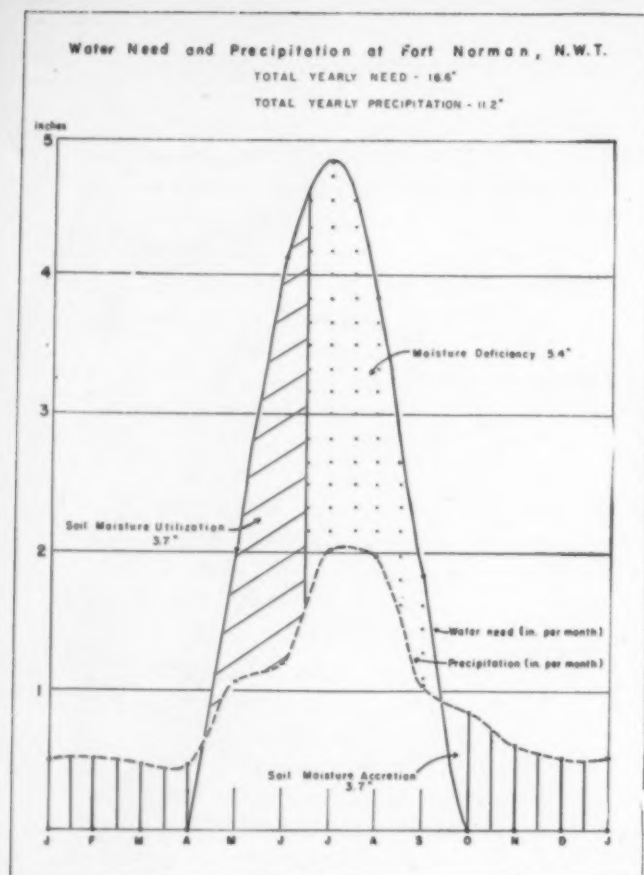


Fig. 3

west zoning commonly shown on maps, particularly the westward continuation of the podsol belt of eastern Canada.

One of the most common tests for soils is to measure their hydrogen-ion concentration or "pH reaction". The pH reaction of podsol soils, which develop under humid forest conditions, is characteristically acid. For example, the Great Lakes podsols range in pH from 4.8 to 6.1, from extremely acid to moderately acid. The soils of the Mackenzie valley show the following pH reactions.

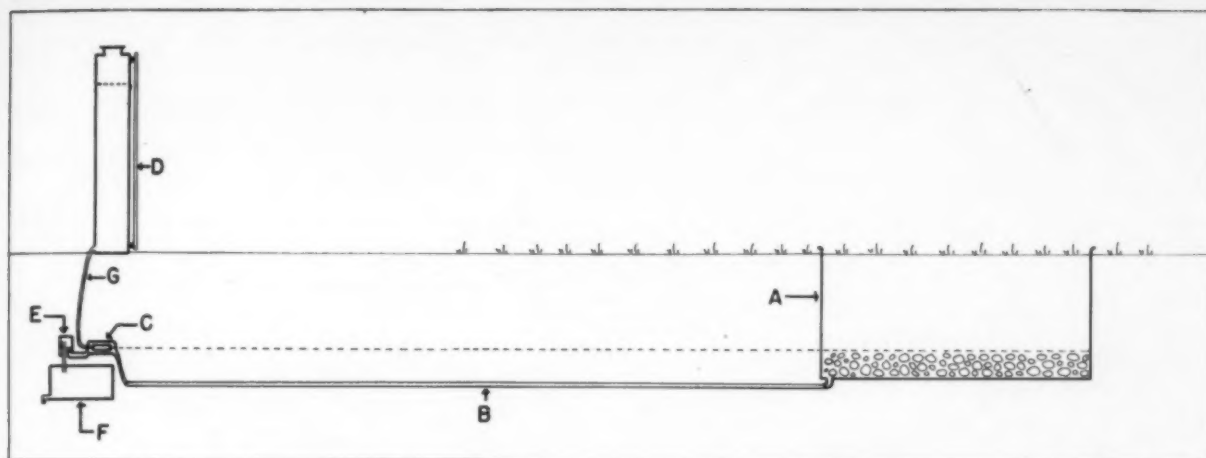
Station	pH ^s
Fort Simpson (virgin soil).....	7.2 - 7.5
(cultivated soil).....	6.6 - 7.7
Hay River	7.4
Fort Liard.....	7.1
Station	pH ⁴
Aklavik	7.4 - 7.5
Arctic Red River.....	6.4 - 7.9
Fort McPherson.....	5.3
Fort Good Hope.....	7.5
Norman Wells.....	6.8 - 8.0
Fort Norman.....	6.9 - 7.7
Yellowknife.....	6.4
Fort Smith.....	6.9
Fitzgerald.....	6.2

All the river valley soils react from mildly acid to mildly alkaline, and are more closely related to subhumid and semiarid soils than to humid podsols.

Observations from Climatic Experiment

According to Thornthwaite's classification, the summer water need or potential evapotranspiration is high in the Canadian north-west. As an illustration, Fig. 3 shows the annual march of potential evapotranspiration at Fort Norman (65° N.) compared with average precipitation. The monthly values of water need were obtained by means of the Thornthwaite formula from the mean temperature modified by a length-of-day factor.

The solid black line represents the rate of potential evapotranspiration in inches per month. It varies from 0 during the winter months to almost 5 inches in July. The rate of precipitation, shown on the graph by the dashed line, varies from a winter minimum of only 1/2 inch to a July maximum of 2 inches per month. During January, February, March and April, the need for water is 0 at Fort Norman, but during the long days of May the temperature rises rapidly and the monthly water need of 2 inches is greater than the precipitation. This also true during June, when the need exceeds 4 inches. During this period, the plants obtain part of their water needs from the reserves of moisture stored in the soil. This is shown on the graph by the area marked "soil moisture utilization". When the moisture reserves are exhausted, and in Fort Norman this occurs about the end of June in the average year, the crops must depend on current precipitation for their water supply. Usually the summer rainfall is not enough to meet the demand and a water deficiency, or drought, occurs. At Fort Norman the deficiency amounts to more than 5 inches in an average year. Not until the end of September does precipitation equal need and permit moisture reserves to be built up again in the soil. The light precipitation during the winter months is not sufficient to saturate the soil and the "soil moisture accretion" amounts to only 3.7 inches. This ability to assign quantitative values to the important climatic



Diagrammatic sketch of apparatus to measure evapotranspiration.

FIG. 4

elements of water need and water deficiency is one of the chief merits of the Thornthwaite formula.

To test, by actual measurement, the high values of water need in the northwest indicated by the Thornthwaite formula, an evapotranspiration experiment was begun in Norman Wells on the Mackenzie River in 1949. The principle of the experiment is to keep a grass-covered area, with approximately natural microclimatic conditions, constantly supplied with water by sub-irrigation and to measure the daily water use⁹. It is assumed that the grass will use all the water it requires and that evapotranspiration will depend solely on atmospheric conditions. A diagrammatic sketch of the apparatus is shown in Fig. 4.

Tank A is buried in the soil, and is itself filled with soil and the surface planted with grass. Shown at the left is the water supply mechanism. The water moves from the reservoir D, through a carburettor float valve C, which maintains a constant level of water in the evapotranspirometer tank, then by means of pipe B to tank A. It is thus a simple daily matter to read the scale mounted on the reservoir tank to determine the

amount of water used by the grass. When rain occurs, the water reverses its flow through pipe B and an overflow arrangement E allows the collection of the overflow water in tank F, where it can be measured. In this way, all the water entering or leaving tank A can be measured and the daily values of potential evapotranspiration or water loss easily obtained.

The two evapotranspirometer tanks which were installed at Norman Wells are seen in Fig. 5 with the grass planted, but not yet visible. The close correlation between the measured water losses and those computed by the Thornthwaite formula can be seen in Table I and Fig. 6.

TABLE I
Potential Evapotranspiration,
Norman Wells (in cms.) 1949

	Measured	Computed
July.....	14.3	12.1
August.....	9.0	11.1
Total.....	23.3	23.2

Table I shows that the measured water losses for the season totalled 23.3 cms.; the computed, 23.2 cms. Fig. 6 shows daily values of water loss averaged for seven-day periods. The solid line represents measured and the dashed line computed evapotranspiration.

Fig. 5



7-DAY AVERAGE VALUES OF POTENTIAL EVAPOTRANSPIRATION, NORMAN WELLS, N.W.T., 1949

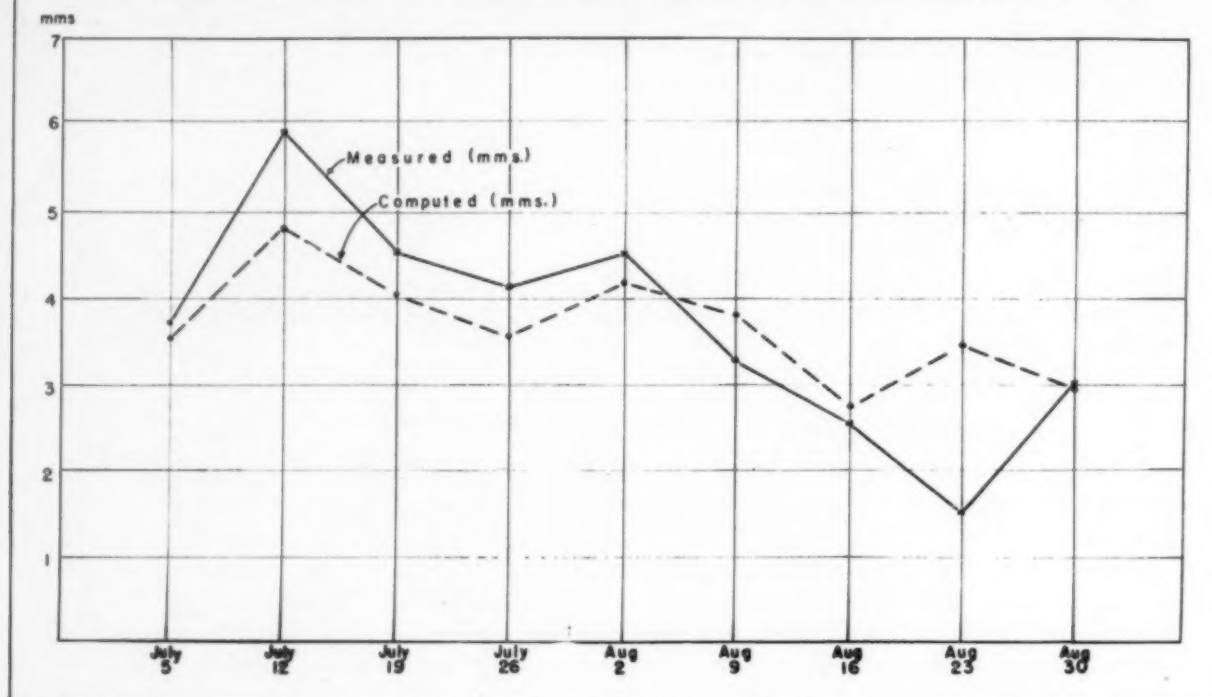


Fig. 6

There is no doubt that summer water needs were high at this northern station. The measured water loss during July was the same as that from similar evapotranspirometers at Toronto, although the mean monthly temperature at Norman Wells was only 61° F., and at Toronto 74° F. In mid-July, the average daily water losses were almost 7 mms. at latitude 65°, while in Toronto during mid-July, they were only 5 mms. for a similar 24-hour period. The results from the first season's experiment at Norman Wells indicate that the Thornthwaite formula gives remarkably accurate figures of potential evapotranspiration at this northern latitude.

The actual measurement of potential evapotranspiration in northwestern Canada does not substantiate the statement that the need for water is low and a humid climate results. In addition, the indication of drought from experiments on crop production and the evidence of dryness in the soils lend support to the Thornthwaite classification of the northwest as climatically dry subhumid.

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EDITOR'S NOTE-BOOK

Adelaide Leitch grew up in Toronto and graduated from the University of Toronto. She spent the next five years as a newspaper reporter, half the time on the *Midland Free Press Herald*, the remainder on the city staff of the *Windsor Daily Star*. Miss Leitch's travels have taken her northwest to the Yukon and Alaska and east to Newfoundland, Labrador and the French islands of St. Pierre and Miquelon. She is a free-lance writer and she illustrates her articles with her own photographs. Her articles have appeared in many Canadian periodicals.

* * *

V. S. Swaminathan, at present living in England, was a research scholar in geology at Madras University. Later he was appointed assistant Professor of Geology at Presidency College, Madras. Mr. Swaminathan continued his studies as Sir William Meyer student for geographical research at London University. Early last year he spent several weeks in Denmark studying farming methods and the co-

operative movement. He has published numerous articles and has lectured in Britain on geographical subjects.

* * *

John Armistead Wilson, C.B.E., has been closely associated over a long period of years with the development of aviation in Canada. Born in Scotland, Mr. Wilson attended school and St. Andrews University there, and was engaged in private engineering practice in Scotland, England and India before coming to Canada in 1905. In 1910 he joined the Government Service and served as Director of Naval Stores and Contracts until 1918, when he was appointed Assistant Deputy Minister of Naval Service in charge of organizing the Royal Canadian Naval Air Service. After the war he became a member—and later Secretary—of the first Canadian Air Board, formed in 1919. In 1922, when the work of the Board came under the Department of National Defence, Mr. Wilson was placed in charge of Civil Aviation; in 1926 he was appointed Controller of

(Continued on page X)



"Kingsbeer"

The finest rice beer
ever brewed!

(Continued from page IX)

Civil Aviation and in 1941 was promoted Director of Air Services Branch of the Department of Transport, which position he occupied until his retirement in 1945. As a Director, and later Vice-President, Mr. J. A. Wilson has taken an active part in the affairs of The Canadian Geographical Society since it was formed in 1929.

* * *

Marie Sanderson, after graduating from the University of Toronto, studied climatology under Dr. C. W. Thornthwaite at the University of Maryland, where she received her M.A. Since returning to Toronto she has been engaged in climatic research at the Ontario Research Foundation, applying the Thornthwaite climatic methods to Canadian statistics. Last year Mrs. Sanderson received a grant from the Arctic Institute of North America to establish an evapotranspiration experiment at Norman Wells in the Northwest Territories.

AMONGST THE NEW BOOKS

Malta: An Account and an Appreciation

by Sir Harry Luke

(George G. Harrap, London;

Clarke Irwin, Toronto, \$3.75)

This is a delightful little book, and all who read it will be deeply thankful that Sir Harry Luke — noted writer (principally on countries of the Mediterranean area), traveller and administrator (with thirty-five years in the Colonial Service) — has provided at last an "Appreciation" of the historic island which, as Lieutenant-Governor from 1930-38, he came to know and love so well.

The term "Appreciation" is the author's own, and it is difficult to think of a more definite category to which his book may be assigned. It is not a guide, nor a political treatise, nor a history — though it contains much of historical interest (how vividly are evoked events and personalities of the past), and much of contemporary import, too. Rather, it is a rich blend of varied ingredients compounded by a charming and scholarly writer whose wisdom is tempered by wit and whose enthusiasm for the island, its traditions, its art treasures and its people is genuine and infectious.

Possibly the briefest way to suggest the scope of the subject matter is to list a few chapter headings. From a total of twenty, let us select the following: — (II) "Where and What is Malta?"; (III) "Early Days";



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(IV) "How the Knights of S. John came to Malta"; (VIII) "Interlude: A Restoration Naval Chaplain in Malta"; (XIII) "After the Treaty of Paris"; (XIV) "What they [various poets, 'politicians' and other notables] thought of Malta"; (XV) "Churches and Palaces"; (XVIII) "Old Survivals in Modern Malta"; (XX) "Malta, George Cross".

The text (well indexed, and printed with wide margins and admirably clear type) is accompanied by a large number of excellent illustrations (also indexed) and two maps.

Highly recommended reading!

K.C.

Rainy River Country

by Grace Lee Nute

(The Minnesota Historical Society, St. Paul, \$2.00)

This brief history of the region bordering Minnesota and Ontario brings the distinguished Minnesota historian, Dr. Nute, back to familiar stamping-grounds. The present work is a companion volume to the historical treatise on the border country, *Voyageur's Highway*, published in 1941. Previous to that, she had produced a full-length portrait of *The Voyageur* himself. In 1944, her *Lake Superior* was published in the "Lakes of America" series.

More localized in interest than her previous books, *Rainy River Country* is valuable not only in the historical files, but as better-than-average background reading for the traveller. It is decidedly international in flavour, with more emphasis on the Canadian aspect than might be expected. Dr. Nute is one American writer who recognizes that life does not suddenly cease north of the International Boundary.

Dr. Nute knows thoroughly not only the history of the border country west of Lake Superior, but its present-day aspects as well. In the present slender volume, she touches on the commercial fishing, farming, mink ranching, and the early mining of the Rainy Lake area. A greater amount of space is devoted to lumbering which has long been the vital industry in northern Minnesota and north-western Ontario.

Her seventh and last chapter, "Today in the Borderlands" deals largely with the activities of "Mando"—the Minnesota and Ontario Paper Company, known north of the border as the Ontario-Minnesota Pulp and Paper Company, Limited—which finances the publication. Mando is the most important industrial factor in the lives of Kenora and Fort Frances in Ontario, and of International Falls, Minnesota, but the subject is handled with finesse, not bombast. The chapter also includes references to tourists, to wild life, to the forest reserves along the border.

Rainy River Country is no dry-as-dust history, but is thoroughly readable. It is unquestionably accurate, but Dr. Nute is happiest in the chapters dealing with the fur traders and early travellers through the region. There is warmth and colour in the descriptions of life in the environs of Fort Frances a century ago, which is impossible in estimating how many million board feet were logged on the Little Fork in 1905. It is some-

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what startling to learn of the "very extensive Canadian depredations" on Minnesota woodlands before 1900.

There are many fascinating tales tucked away in a sentence or phrase, alluring by-paths which had to be firmly, if reluctantly, ignored for the sake of continuity. Those who wish to pursue the by-paths will find the list of books consulted by Dr. Nute in the form of an excellent bibliography. The index is also adequate. The forty-four photographs are largely of historical scenes, a few depicting modern fishing and lumbering. Three sketch maps are included, as well as end-paper maps. The book is a well-rounded entity, though slight, produced by a writer of experience who is a trained historian.

LYN HARRINGTON

This is Nova Scotia

by Will R. Bird

(Ryerson Press, Toronto, \$3.50)

In a pleasant pilgrimage into the past, Will Bird of the Nova Scotia Travel Bureau, takes the reader on the road round the eastern province. History, legend

(Continued on page XII)



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(Continued from page XI)

and anecdotes are threaded like beads on the highways looping the province. Mr. Bird has conned the truth that the landscape is enriched by the power of suggestion. Association with events, no matter how remote, heightens the pleasure of a scene.

"We motored into the peninsula as if we were strangers, trying to view it as a visitor who had not been there before, and made our resolve to make a complete encirclement of the province, avoiding side roads, and telling only of what we saw and encountered as we made the tour," says the author in his opening paragraphs. (He does not explain that his companion is Mrs. Bird, who maintains a remarkable silence throughout the book.)

Mr. Bird set himself an impossible task. He knows Nova Scotia much too well to view it with detachment. He neither sees with the eye of a stranger, nor hears with the outsider's ears. The latter would see more than Mr. Bird describes, and hear less, for the Nova Scotian does not open his heart and his lore of information to the casual tourist. But all Mr. Bird's conversations have a ring of authenticity about them.

In spite of its movement round the province, *This is Nova Scotia* is more story than travel, certainly not a geographical treatise. It is local history told by a garrulous farmer, an easy-going fisherman, a gossipy berry-picker. Bits of poetry, ballads and sea-chanties are charmingly woven into the fabric. The whole piece has the charm of coming straight from the grass-roots. And Mr. Bird has an unquestionable flair for telling stories with a deft humour, or touch of pathos.

But how does the tourist reach Nova Scotia? Mr. Bird starts his tour (and ends it) at the Missigash River. Surely the tourist must traverse New Brunswick to get there? Canadians often bewail the provincialism of travel bureaus, and that may account for the surgical dispatch toward the sister province. How can anyone write of Chignecto, with only a fleeting reference to Fort Beauséjour? The National Historic Park happens to be half a mile within the border of New Brunswick, but the old fort played a significant part in the destiny of the sea-girt province, and of Canada as a whole. Mr. Bird gets around this insular attitude rather aptly on his first page, by declaring, "Average Nova Scotians are quite content to feel apart".

The book is good arm-chair reading, and will be a delightful companion to tourists jaunting round the province. The chapter on Cape Breton Island is particularly readable from the traveller's point of view—somehow the author *sees* more there—but the whole book has the warm good-humour of a well-loved story, one that has mellowed like plum pudding.

The fifty photographic illustrations supplied by the N.S. Travel Bureau are excellent, though most are two-on-a-page. One can understand how the publishers could not bear to omit any of them.

LYN HARRINGTON